DECEMBER 1961

DETROIT PUBLIC LIBRARY
SEP 27 1961
TECHNOLOGY DEPARTMENT

RUBBER WORLD

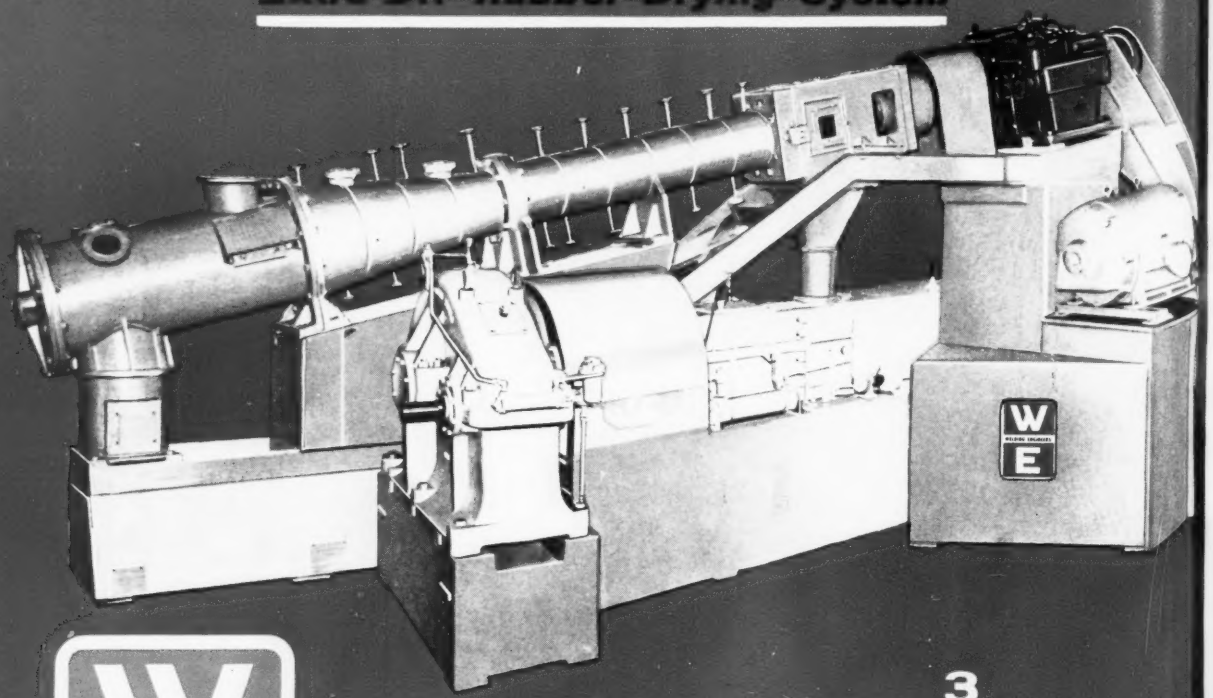
145 113

Firestone's MacGowan Predicts... Increasing Growth Rate

Convincing Performance

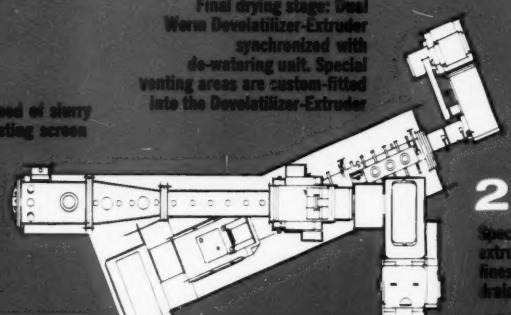
Welding Engineers Continuous Operation

Extru-Drl* Rubber Drying System



3
Final drying stage: Dual Worm Devolatilizer-Extruder synchronized with de-watering unit. Special venting areas are custom-fitted into the Devolatilizer-Extruder

1
Initial feed of slurry via vibrating screen



2
Special de-w... extruder with fines-free wa... draining feed...

WELDING ENGINEERS

For the Production of Extrusion-Dried Rubber

This is the equipment advance that "commands" investigation and investment: Dry Rubber Extruded from We... Crumb Feed in ONE completely inter-related dual system expressly designed for this vital function. This Extru-Dr... synthetic rubber drying system is compatible with your processing and your rubber. ● Experience in the field right now proves the continuous operation of this system is free from problems common to other methods: Now—no clean-out problem! Now—product quality is almost automatic! Now—maintenance is practically nil! Rate experience: 50 to 60 tons per round-the-clock day with less labor, less power, less cost per pound. This is the time to get the facts: write, wire, or arrange for a personal visit.

Developed and Manufactured by Welding Engineers, Inc., Norristown, Pennsylvania

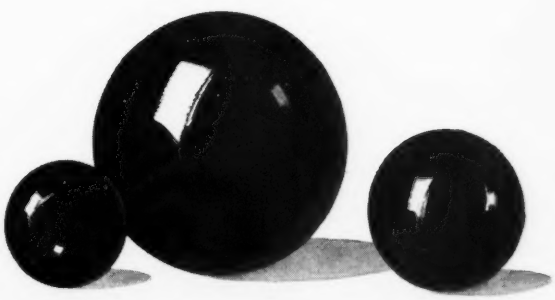
Custom-fitted equipment for the rubber, plastics, and chemical industries: European Sales Representatives: Welding Engineers Ltd., Geneva, Switzerland. Far East Representatives: Marubeni Iida Co., Ltd., Tokyo, Japan.

*Patents applied for

RUBBER WORLD, December, 1961, Vol. 145, No. 3. Published monthly by BILL BROTHERS PUBLISHING CORP. Office of Publication, 3rd & Hunting Park Ave., Philadelphia 40, Pa., with Editorial and Executive Offices at 630 Third Avenue, New York 17, N. Y., U.S.A. Second Class Postage paid at Philadelphia, Pa., under the act of March 3, 1879. Subscription United States $5.00 per year; Canada $6.00; all other countries $10.00. Single Copies 50¢ in U.S.; $1.00 elsewhere. Address Mail to N. Y. Office.

Copyright December, 1961, by BILL BROTHERS PUBLISHING CORP.

B.F.Goodrich

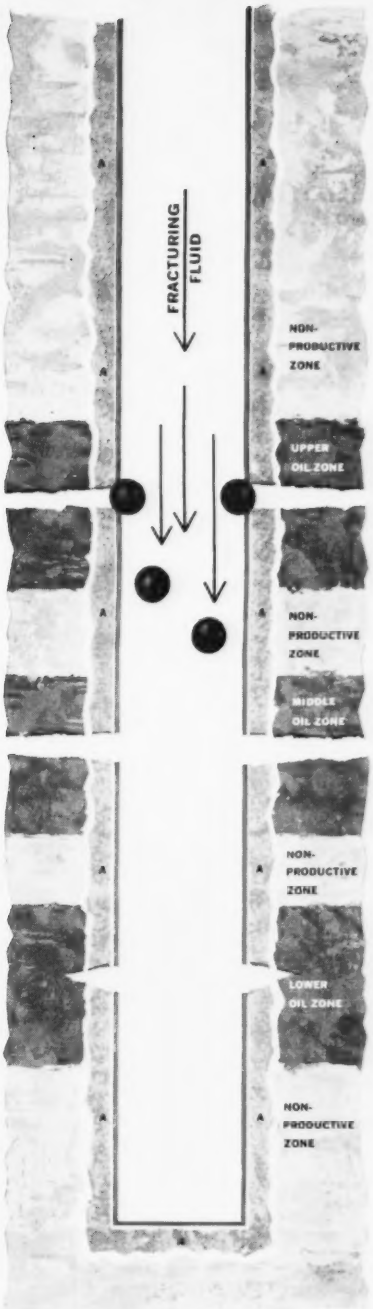


Deep in an oil well, these balls prove the toughness of Hycar rubber

Each of these balls covered with Hycar nitrile rubber will be used deep inside an oil well to seal off casing perforations taking fracturing fluid. The fluid is used to increase productivity of wells by creating fractures in the underground strata. Multiple fractures are desired, so the balls are needed to seal off perforations leading to existing fractures.

The balls are injected into the fracturing fluid stream finding their own places as pressure forces them onto holes in the casing. Their solid center, of nylon, keeps them from extruding or squeezing through the holes. Their Hycar cover assures that they'll stay resilient and remain effective even under high-temperature conditions, pressure and abrasion. Because of the unusual resistance Hycar offers to hydrocarbons and chemicals, the acidizing or fracturing solutions do not affect these tough Hycar covers.

Here's another sample of the way Hycar provides resilience under the toughest oil-field conditions—of heat, pressure and corrosive influences. It will pay you to get more information about Hycar. Write Department MD-10, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. In Canada: Kitchener, Ontario.



(A) Sheath of set cement between pipe and wall of hole.

Halliburton Company, Duncan, Oklahoma, uses these balls for its oil well fracturing operations. Balls are covered with Hycar by Oil States Rubber Company, Arlington, Texas. B.F.Goodrich Chemical Company supplies the Hycar rubber.

B.F.Goodrich Chemical

a division of The B.F.Goodrich Company

Hycar

Rubber and Latex

RUBBER WORLD

VOLUME 145 NUMBER 3 DECEMBER, 1961

CONTENTS

71 **What's Ahead . . . ?**
. . . . . **An editorial by R. S. Walker**

73 **Automatic Carbon Black Handling**
. . . . . **John Aquadro**

76 **Polyolefins Improve Heat Aging Of Clay-Loaded Butyl Insulation**
. . . . . **F. Rodriguez and C. C. Winding**

80 **New Techniques for Evaluating Pigment Dispersion in Rubber—II**
. . . . . **William M. Hess**

85 **Clap-Hands Press Cuts Auto Mats**

87 **Sneakers Are In**

94 **Malayan Minister Strongly Denounces New GSA Stockpile Disposal Program**

Cover Story

101 **Good 1962 and Excellent Future Growth Predicted at RMA Meeting**

This month's cover shows Mr. T. G. MacGowan, director of advance planning, The Firestone Tire & Rubber Co., addressing the Annual Meeting of The Rubber Manufacturers Association, Inc., with his prediction of increased rubber industry growth through 1975.

Cover design by Robert McElrath

SERVING THE RUBBER INDUSTRY SINCE 1889

A BILL BROTHERS PUBLICATION

FEATURE DEPARTMENTS

News of the Rubber World	7
New Equipment	8
New Materials	34
Book Reviews	46
New Publications	46
New Products	56
Calendar of Coming Events	68
Meetings and Reports	89
Washington Report	94
Industry News	101
News Briefs	106
News About People	107
International Picture	113
Market Reviews	118
Statistics	128
Index to Advertisers	141

EDITORIAL STAFF

Richard S. Walker — Editor
Robert G. Seaman — Senior Editor
S. R. Hague — Managing Editor
Stuart V. d'Adolf — Assistant Editor
M. Jacobson — Technical Editor
E. S. Ladd — Editorial Assistant
L. Thakar — Foreign Editor
M. Pifko — Production Manager
R. V. Bergin — Circulation Manager
George W. Booth — Art Director

Editorial Advisory Board

J. J. Allen — Firestone Industrial Products
John Ball — Midwest Rubber Reclaiming Co.
B. H. Capen — Tyer Rubber Co.
J. H. Fielding — Armstrong Rubber Co.
S. D. Gehman — Goodyear Tire & Rubber Co.
L. H. Howland — Naugatuck Chemical
J. U. Mann — United States Rubber Co.
Edwin B. Newton — B. F. Goodrich Co.
A. I. Ross — American Biltrite Rubber Co.
M. E. Samuels — Copolymer Rubber

BUSINESS STAFF

B. Brittain Wilson — Publisher
R. L. Miller — Business Manager
John W. Hartman — President
Morgan Browne — Vice President

Advertising Sales Staff on Advertisers' Index

BILL BROTHERS PUBLISHING CORPORATION

Chairman of the Board, Philip Salisbury. President, John W. Hartman. Vice Presidents, Lawrence Bell, C. E. Lovejoy, Jr., W. H. McCleary, B. Brittain Wilson. Subscription price: United States and Possessions, $5.00; Canada, $6.00; Other countries, $10.00 per year. Single copies: U. S. 50¢; elsewhere $1.00. Other Bill Brothers Publications: Fast Food, Modern Floor Coverings, Modern Tire Dealer, Plastics Technology, Premium Practice, Sales Management, and Sales Meetings.

Editorial and Executive Offices:
630 Third Avenue, New York 17, N. Y.
212—YUkon 6-4800

BPA NBP IPI

KETJEN CARBON wishing you

Merry Christmas and a Happy New Year!

Blacks from the country where the black grows
KETJENBLACK ISAF NETT 50 Lbs
KETJENBLACK HAF NETT 50 Lbs
KETJENBLACK FEF NETT
KETJENBLACK SRF NETT 50 Lbs
Daly

Sales office:

NEDERLANDSCH VERKOOPKANTOOR VOOR CHEMISCHE PRODUCTEN N.V.

63, Mauritskade, Amsterdam - Holland - P.O.B. 4038 - Tel. 54322 - Telex: 12270 - Telegrams: Chemicals

KETJENBLACK ISAF • KETJENBLACK LHI • KETJENBLACK HAF • KETJENBLACK CR • KETJENBLACK FEF • KETJENBLACK FF • KETJENBLACK GPF • KETJENBLACK SRF

news of the rubber world

December, 1961

Predictions for 1962 brought potential good news for both natural and synthetic rubber producers as well as the industry at large. RMA President Ross R. Ormsby predicts a rise of 7 1/2% in new rubber consumption for a total of 1,615,000 long tons, second only to 1959's 1,628,000. The International Rubber Study Group, in its worldwide estimate, sees natural rubber consumption just equal to production plus stockpile sales. Production of 2,018,000 long tons and stockpile sales of 32,000 long tons will match estimated consumption of 2,050,000 long tons of natural. This committee estimates member country consumption of synthetic rubber of 1,870,000 long tons from production of 1,940,000 long tons.

We conclude, in this issue, the report on current progress of the pigment dispersion studies conducted by Columbian Carbon Co. The first report on this study of "Dispersion in Depth" appeared in RUBBER WORLD in September, 1958, authored by Dr. C. W. Sweitzer and J. E. Callan as well as current author William M. Hess. As we go to press, we find that there are a few corrections to last month's Part I. A list of these corrections will be found on page 126.

The General Services Administration (GSA) has had a change in administrator in the wake of the recent rubber stockpile hassle. See page 94. Former University of Pennsylvania Vice President John L. Moore resigned, saying simply that he'd had enough. According to the Washington Post, he said, "Government service is just too much." In a Thanksgiving Day release, the White House announced Moore's resignation and said he "felt a strong urging to return to the educational field." Neither report made any specific mention of the rubber stockpile situation. New GSA administrator will be Bernard L. Boutin, who twice ran on the Democratic ticket for Governor of New Hampshire.

ADD "WHITE" TYPE

Factice®

VULCANIZED VEGETABLE OIL
TO YOUR COMPOUND

for Reduction in Milling Time and Better Dispersement of Fillers.

Typical products using Factice "White" in compounding formulas.

Until the introduction of Amberex, another type of Factice®, white Factice® was the only vulcanized vegetable oil which could be used in light-colored goods, such as those shown above, where good calendering properties and smooth stock are essential.

Rapeseed oil produces the driest white Factice®, and this type may contain mineral oil or fillers. Compounders have found that for a loaded stock it is advantageous to use this rapeseed Factice® white, containing fillers, to reduce milling time of the compound and to improve the dispersion of fillers. Send us your compounding formula for our suggestions. All formulas held in strict confidence. Our trained staff will help in selecting the proper vulcanized vegetable oil for your need . . . Factice® White, Brown, Neophax or Amberex.

Factice Vulcanized Oil

THE STAMFORD RUBBER SUPPLY CO.
STAMFORD, CONN.

new equipment

Pasadena Hydraulics new 600-ton model has a 60-inch stroke, 72-inch daylight and 60-inch square platens. The base is approximately seven feet square, and the control console may be located to suit

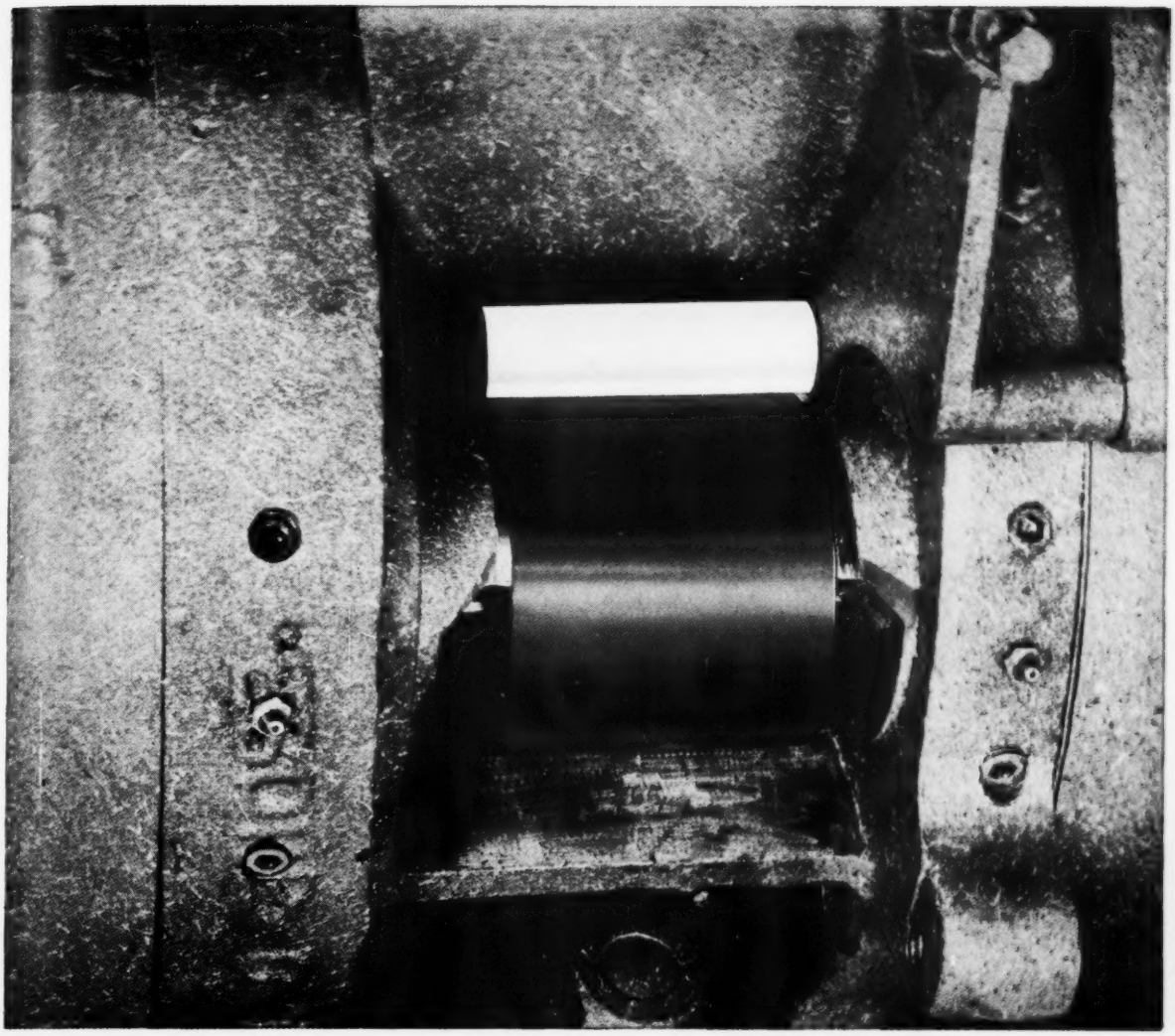
PHI Introduces Larger Molding Presses

Pasadena Hydraulics, Inc., El Monte, Calif., has added a line of platen presses to meet the increased needs of the industry for larger capacities.

The presses range from 150- to 1,000-ton capacities and include a hydraulic system which offers great flexiblility such as ram force at a selected position, sequential cycling and preselected holding period, and precise opening and closing speeds. The platens may have individual temperature controls and be heated by steam or electricity.

New Fire Blanket

A wool blanket that snuffs out flames when clothing is afire has been developed by Mine Safety Appliances Co., Pittsburgh, Pa. Specially designed for use in chemical plants and laboratories, the 62-by 82-inch fire blanket is designed for vertical attachment to a wall near danger points in industrial plants. A loop of fireproofed rope extends outside the case. In an emergency, the victim pulls the rope, thus opening the metal case door and permitting the protective covering to move forward as the victim revolves, wrapping himself in the blanket.



Royle Extruders Increase Room Temperature Feeding Efficiency

Those working with room temperature feeding are familiar with the many economic advantages this method offers.

Royle Extruders are designed to *utilize* and *increase* these advantages to the utmost.

As an example: the Royle Constant Pressure Roller Feed Hopper — with its new adjustable spring-loaded Teflon roller — assures closer tolerance control. It gives improved product density by eliminating porosity and cuts down rubber waste.

The new Royle Constant Pressure Roller Feed Hopper is available on all size Royle Extruders.

Write today for full information on Royle Rubber Extruders.

ROYLE
Paterson, N. J.

JOHN ROYLE & SONS

Pioneered the Continuous Extrusion Process in 1880

6 Essex Street, Paterson 3, New Jersey

Tudor Road, Wealdstone, Middlesex, England, James Day (Machinery) Ltd., Harrow 2655-6. **Home Office,** V. M. Hovey, J. W. VanRiper, SHerwood 2-8262. **Akron, Ohio,** J. C. Clinefelter Co., Blackstone 3-9222. **Downey, Cal.,** H. M. Royal, Inc., TOpaz 1-0371. **Tokyo, Japan,** Okura Trading Company, Ltd., (56) 2130-2149.

vulcanized vegetable OILS rubber substitutes

THE CARTER BELL MFG. CO. SINCE CARTER BELL PRODUCTS 1903 SPRINGFIELD, NEW JERSEY

Types, grades and blends
for every purpose, wherever
Vulcanized Vegetable Oils
can be used in production
of Rubber Goods —
be they Synthetic, Natural,
or Reclaimed.

A long established and proven product.

THE CARTER BELL MFG. CO.

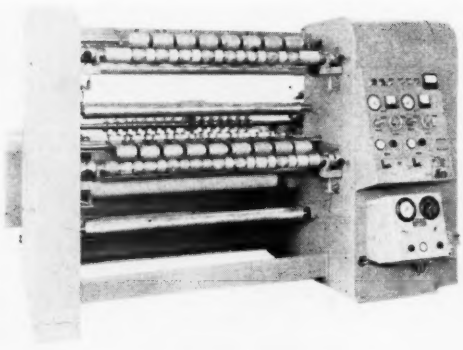
SPRINGFIELD, NEW JERSEY

Represented by

HARWICK STANDARD CHEMICAL CO.

Akron, Boston, Chicago, Pico Rivera, (Cal.), Trenton, Denver
Albertville, (Ala.), Greenville, (S. C.)

new equipment



Hobbs Model MDHS high-speed slitter

Slitters for Wide Industry Demands

Hobbs Mfg. Co., Worcester, Mass., recently introduced four slitters to meet variable requirements of industry.

Model A is a basic, all-purpose machine which will score cut or shear cut paper, electrical insulation, certain lightweight rubber materials, cotton ducks, other textiles, etc., except delicate plastic films. It is a d.c.-powered unit with a speed up to 500 fpm. Width ranges are 40, 50, 60, and 72 inches or special widths for custom units.

Model B is a variation of Model A designed especially for use on materials wound with individual tension on rewound webs. The shafts are equipped for differential winding, and the slitter can be manually or automatically air loaded to maintain web-tension control.

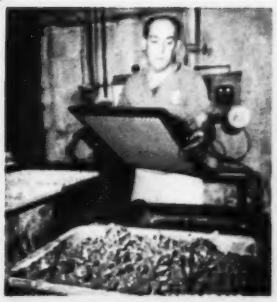
Model C is for slitting paper, fiber glass mats, and other non-woven materials. It can be a.c.- or d.c.-powered with a speed range of 200-300 fpm, in widths from 40 to 84 inches. Web-tension control is provided by two Hobbs CHP winders.

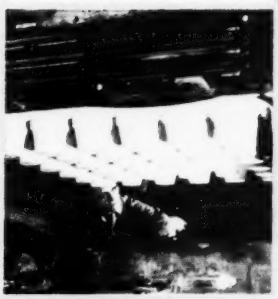
Model MDHS is a high-speed slitter which offers a choice of score, razor, or shear slitting heads. It is a d.c. unit with speeds up to 1500 fpm., in widths of 50, 60, and 70 inches.

Electrically Heated Platens

Electrically heated platens for vulcanization of utility tires, aircraft gas tank linings, deicers, conveyor belts, etc., are available from Sta-Warm Electric Co., Ravenna, O. The platens are designed and fabricated to the user's specifications. Use of an exclusive multiple-circuit, blanket-type heating element allows heat to be applied either uniformly or in varying watt densities. Hot spots can be created by variation of element location. Various controls are available such as bi-metal or pressure-type thermostats, thermocouples, potentiometers, variable on-off time controls, and simple three-heat switches.

(Continued on page 14)





If your quality control line looks like this...

and you want it to look like this...

you should know all about

PLIOFLEX

with Assured Processability

GOODYEAR

CHEMICAL DIVISION

GOODYEAR

Now, more than ever...

Plioflex with exclusive Assured Processability

Quality control starts with the raw material. Yet until recently, manufacturers of rubber products had no adequate control over processability of raw polymers.

Then Goodyear made a precedent-setting announcement. It read: "Now for the first time – in any rubber – you can be sure of processability – bale after bale, shipment after shipment." The reason? Assured Processability became the exclusive property of PLIOFLEX.

Goodyear could make this statement because its technicians had refined a previously developed test and thus established a truly reliable index on the processability of styrene/butadiene rubber. (See details of procedure on the opposite page.)

Assured Processability an immediate success

From the outset, customers welcomed Assured Processability as an answer to a long-standing problem. Now they can tell *in advance* how a particular type of PLIOFLEX will perform every time. *And only the Assured Processability of* PLIOFLEX *provides a realistic indication of how a styrene/butadiene rubber will perform under plant conditions.*

New advances in Assured Processability

In setting up and continually determining Assured Processability Factors of PLIOFLEX, Goodyear technicians gained new insight into the relationship between polymer manufacture and processability. As a result, they are able to modify manufacturing techniques and substantially improve the Assured Processability of various PLIOFLEX types.

EXAMPLE #1: The Assured Processability of PLIOFLEX 1713 has been improved 25%!

EXAMPLE #2: The Assured Processability of PLIOFLEX 1778 has been improved 32%!

EXAMPLE #3: The Assured Processability of PLIOFLEX 1714C has been improved 46%!

What's more, Assured Processability is now extended to the *entire* PLIOFLEX line. *Whatever* PLIOFLEX type you need–you can now be sure of how it will process.

Here's how customers benefit

More and more customers are reaping big benefits from Assured Processability!

One user found that he was able to use PLIOFLEX 1778, thanks to the APF, where no other oil-extended rubber could be used.

Assured Processability pays off in all these applications...and many more!

helps level out your quality control line

Another found he could take advantage of the wide range of lasting, light colors PLIOFLEX 1507 permits *and* maintain economical production with a minimum of costly rejects.

A third discovered that PLIOFLEX 1713 could be used in combination with other rubbers to provide the right color characteristics and save several cents per pound!

You might benefit in still another way!

How Goodyear determines Assured Processability Factors

A laboratory Banbury is loaded with the polymer to be tested under a specific set of operating conditions. The polymer is masticated. Then pigments are added and the time for their incorporation is carefully measured.

Pigment incorporation is the chart-indicated time, in minutes, from the point where the ram is lowered on the pigment-polymer mix to where there is a peak in power consumption followed by a sharp drop. Pigment incorporation time thus provides an accurate measure of processability.

Plioflex—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

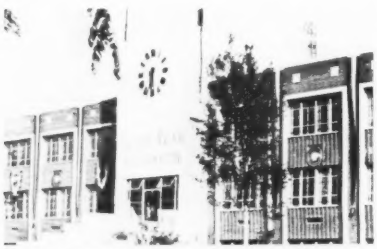
GOODYEAR

CHEMICAL DIVISION

GOODYEAR

And when it's time to specify...

Here are more reasons to specify Plioflex:

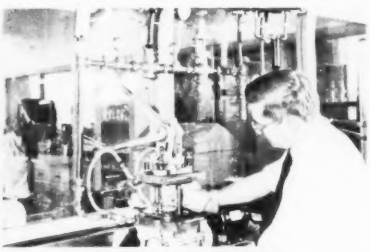


OUTSTANDING RESEARCH FACILITIES

EXTENSIVE SALES-SERVICE LABORATORIES

TECHNICALLY TRAINED REPRESENTATIVES

COMPREHENSIVE TECHNICAL LITERATURE



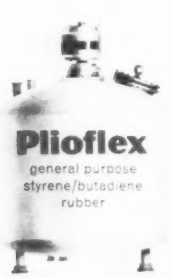
HIGHEST QUALITY STANDARDS

STRATEGICALLY LOCATED WAREHOUSES

And when you specify Plioflex...

it's available in the package that fits your needs best!

1. POLYETHYLENE FILM-WRAPPED BALE 2. 3-SECTION "G" CONTAINER (24 bales) 3. PALLETIZED SHIPMENT, TALC-DUSTED BALE 4. UNITIZED CONTAINER (33 bales)

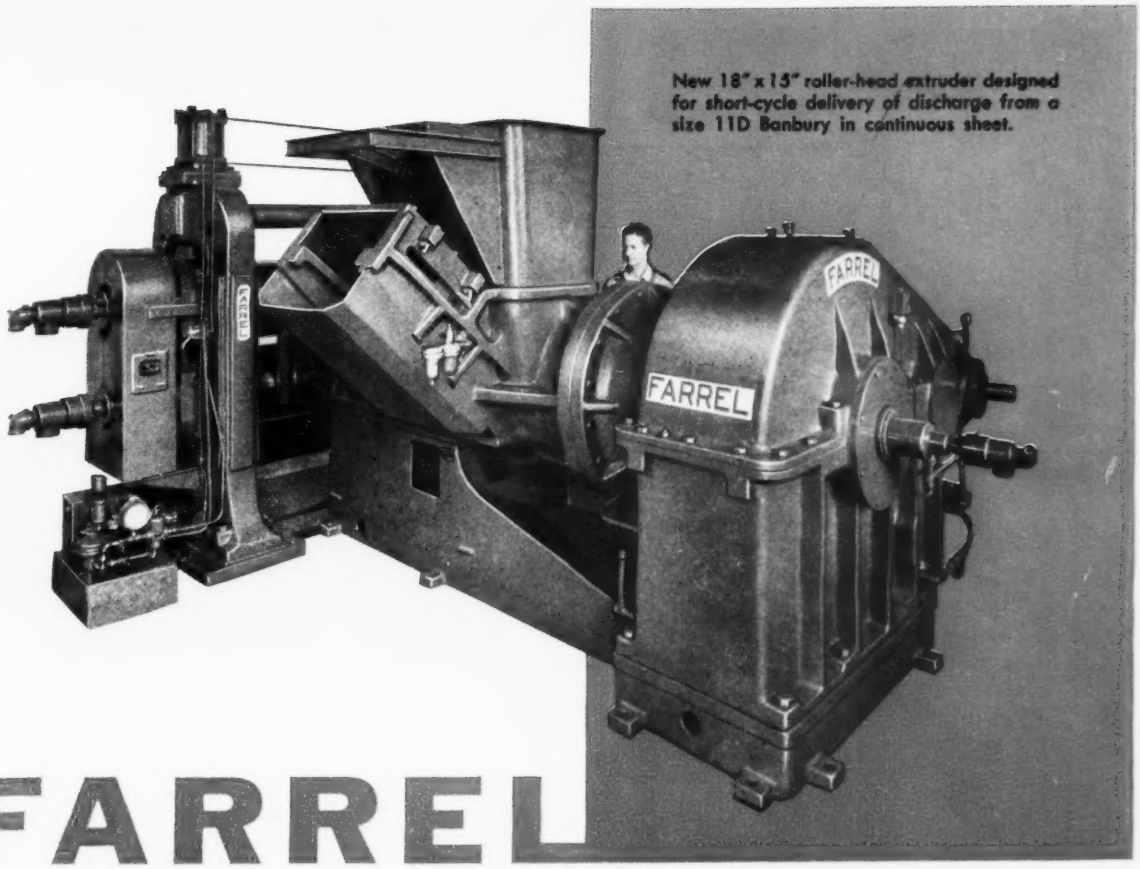


Get more information on PLIOFLEX with Assured Processability—today.
Write Goodyear, Chemical Division, Dept. J-9418, Akron 16, Ohio.

Lots of good things come from

GOODYEAR

CHEMICAL DIVISION



New 18" x 15" roller-head extruder designed for short-cycle delivery of discharge from a size 11D Banbury in continuous sheet.

FARREL

announces another proved means of handling Banbury® mixer batch discharge

These new roller-head extruders were developed by Farrel to eliminate die resistance and resultant increased stock temperatures. Actually the temperatures are considerably reduced. As a result, these machines are ideal for handling finish-mix, heat-sensitive batches from Banbury mixers.

The units consist of an extruder with a slot head that feeds directly into the bank of a two-roll calender. The roller-head die or calender rolls can be cooled as required.

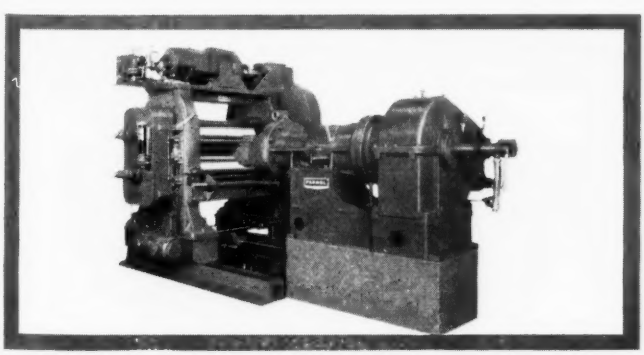
Other advantages include easy cleanout and uniformity of stock quality. Short-cycle Banbury production can be accommodated.

Initial installation was in a tread plant, where results have been highly successful. Subsequent machines, for other applications, have performed equally well.

Now, with Farrel mills, pelletizers, cone-die extruders and the new roller-head machines, there is a wide choice of means for handling Banbury discharge. Ask for a quotation on a unit to meet your requirements.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.
Sales Offices: Ansonia, Buffalo, Akron, Chicago, Los Angeles, Houston, Atlanta
European Office: Piazza della Republica 32, Milano, Italy



FARREL

This strip-feed 8½" extruder feeds directly into a 16" x 42", 2-roll calender for production of slab material ranging from ⅛" to ¾" in thickness. The head is arranged to move to and from the extruder on a sliding base through an air-hydraulic operating system.

FB-1233

THE SECRET IS OUT . . . EEMCO engineers announce the "Unit-drive" for mills, an entirely new concept in mill drives that is eight ways better.

It is quiet running, vibration proof and all lubrication difficulties have been eliminated.

The EEMCO "Unit-drive" mill, mounted on a unified base, can be installed at reduced cost and requires considerably less floor space. Higher operating efficiency at lower maintenance expense added to the points listed above make EEMCO's "Unit-drive" mills today's top equipment topic.

Send for complete informative literature. Convenient lease and time payment plans available.

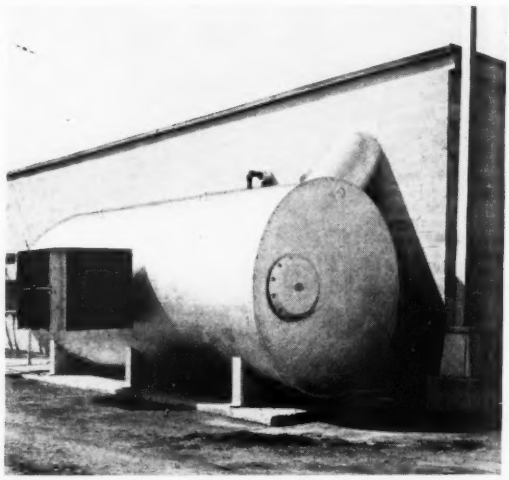
REPRESENTATIVES IN PRINCIPAL CITIES

erie engine & mfg. co.

ERIE, PA . . . PHONE GL 4-7111

new equipment

(*Continued from page 10*)



A typical Coblentz dry-air system installation

Moisture-Free Compressed Air

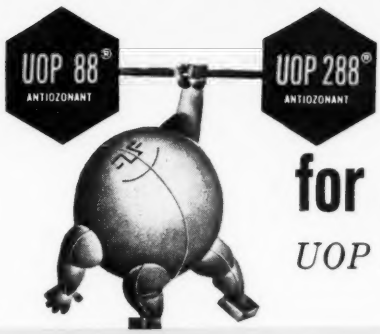
Increased capacity and improved efficiency for compressed-air users are available through the use of a Coblentz dry air system manufactured by Lynch Corp.. Anderson, Ind.

The systems are engineered for each installation and are uniquely designed economically to chill (40° F. or lower), dry, clean, and force air into compressor intakes. It is claimed that this constant frigid-intake air gives greater weight of air per stroke, increases output of compressors, and reduces horsepower per 100 cfm. The constant low-temperature air supply permits the heat of compression to be retained, which together with the other efficiency gains can combine to up to a 35% increase in volume under maximum design conditions. Other claims include the prevention of vibrations and pulsating noises common to compressor intakes, elimination of pressure drop, icing, clogging, and moisture carry-over.

Extruder Measuring Head

C. W. Brabender Instruments, Inc., South Hackensack, N. J., has introduced an extruder measuring head for its Plasti-Corder. The ¾-inch extruder is designed to measure and record processing torque under a wide range of screw speeds and barrel zone temperatures. Forecasting processability of rubber and plastics under typical processing conditions by measuring extrusion rates, extrudate surface conditions, and the effect of lubricants is a practical feature of the equipment.

The extruder has two electrically heated barrel zones, a selection of electrically heated dies, and three electronic proportioning controllers to regulate and maintain zone and die temperatures.



for complete ozone protection...

UOP Antiozonants and the UOP Field Specialist

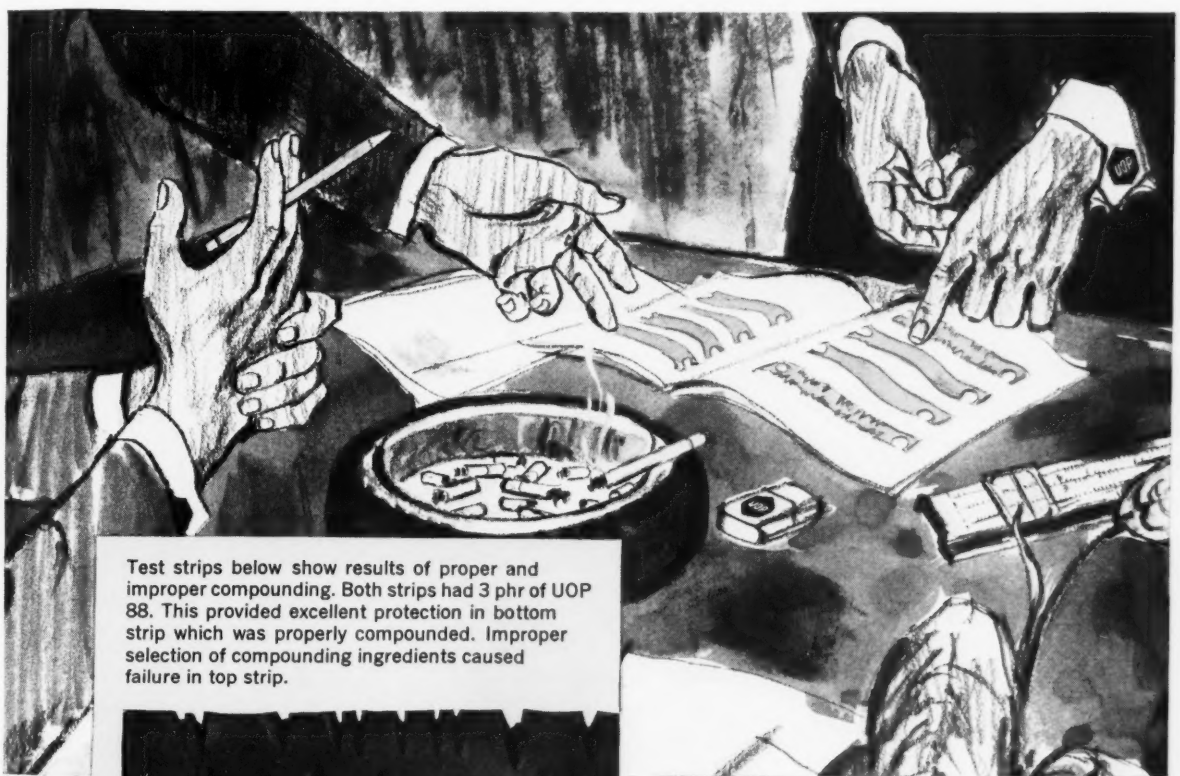
Increasing ozone concentrations in many areas make it more and more necessary that your products have the best possible protection against ozone cracking.

Excellent chemical antiozonants...UOP 88 and 288 . . . that have proven their effectiveness in hundreds of challenging applications are readily available.

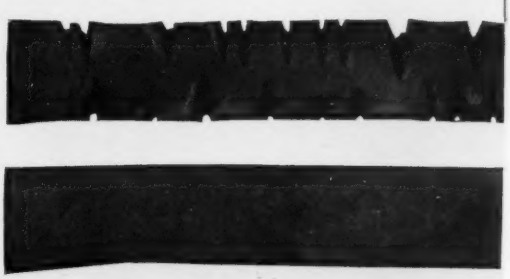
But in protecting against ozone attack, an outstanding antiozonant is only the beginning of the story. The type of natural or synthetic polymer used . . . the curing system . . . the reinforcing agent . . . the service conditions under which the product is to be used . . . all of these factors must be correctly interpreted, co-ordinated, and balanced to provide the most effective protection.

That's where the services of UOP's Field Specialist become important. Qualified by training and long personal experience, he can draw on the results of years of continuous research and testing at UOP's laboratories . . . covering the use of thousands of antiozonant formulations on a wide variety of base stocks. His recommendations may necessarily cover many phases of your operation . . . and they will represent the latest, most effective method of combating the ozone problem for greater customer satisfaction.

To arrange for an early visit from a UOP Field Technical Engineer, without any obligation, call or write our Products Department today.



Test strips below show results of proper and improper compounding. Both strips had 3 phr of UOP 88. This provided excellent protection in bottom strip which was properly compounded. Improper selection of compounding ingredients caused failure in top strip.

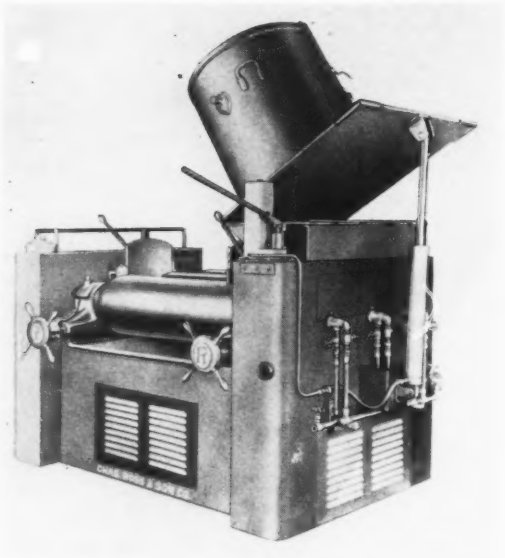


UOP®

UNIVERSAL OIL PRODUCTS COMPANY

30 Algonquin Road
Des Plaines, Illinois, U. S. A.

WHERE RESEARCH IS PLANNED
WITH PROGRESS IN MIND



Can-holding and tilting device from Ross

Tilting Device for Material Dispensing

A simplified-design hydraulic can-holding and tilting device, which allows material to be dispensed from cans on to three roll mills, has been introduced by Charles Ross & Son Co., Inc., Brooklyn, N. Y. The unit accommodates cans of 20-32 inches in diameter and from 13-33 inches deep. A positive self-locking device securely holds the can at all points of tilt. The material is discharged through an adjustable slide lever gate on the can. The equipment can be modified to fit any size of production mill.

Adjustable Response Pressure Controller

Leslie Co., Lyndhurst, N. J., has developed a new single-knob proportional band adjustment to "tune" pilot response to system requirements.

The easy matching of the proportional band controller to the ideal response required in a particular pressure-control system overcomes cycling and unstable control tendencies caused by time lags and system inertia.

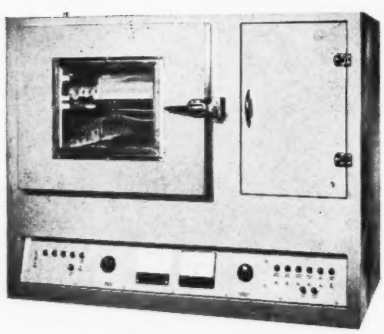
The pneumatic operation permits use of this controller where non-sparking control equipment is required, and it can also be used under corrosive conditions for precise and stable control of steam, gas, or liquids. It is a stock item and can be obtained as direct or reverse acting.

Reliable, Consistent Test Results With . . .

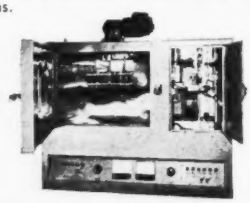
OREC 0300 ***Automatically Controlled Ozone Test Chambers***

REPRESENTATIVE CUSTOMERS UTILIZING OREC OZONE TEST EQUIPMENT

Anaconda Wire & Cable Co.
E. I. DuPont de Nemours & Co.
Esso Research & Engineering Co.
Firestone Industrial Products
General Electric Company
General Tire & Rubber Co.
B. F. Goodrich Research Center
Goodrich Gulf Chemical Co.
Goodyear Tire & Rubber Co.
General Motors Corporation
Phelps Dodge Corporation
Phillips Chemical Co.
Texas U.S. Chemical Co.
TLARGI, U.S.C.
U. S. Rubber Company
Shell Chemical Corporation



Orec 0300 Series employ an *electronic-chemical loop feed back servo system to achieve and precisely maintain chamber ozone concentrations.



Orec 0300 with Dynamic Stretching Apparatus.
* *patent pending*

OZONE:

- TEST CHAMBERS, 6 MODELS
- AUTOMATIC CONTROL SYSTEMS
- RECORDING INSTRUMENTATION
- STRETCHING APPARATUS
- MEASUREMENT INSTRUMENTATION
- GENERATORS
- TESTING SERVICE
- RESEARCH & DEVELOPMENT

Write for illustrated brochure

Ozone Research and Equipment Corporation

3840 North 40th Avenue **Phoenix, Arizona**

N

Development quantities available now

New AMOCO Resin 18 styrene-type resin

Here's an attractively priced new resin with unusual properties that make it worth evaluating.

AMOCO Resin 18 is light in color and color stable. It is soluble in aromatics; resistant to acid, alkali, water and grease. It is compatible in SBR, Natural and Neoprene rubber formulations.

AMOCO Resin 18 can offer you real opportunities for product cost savings through the replacement of higher priced resins while at the same time permitting you to produce an equal or better quality finished product.

You will want to investigate AMOCO Resin 18 if you manufacture any of these:

Floor tile—vinyl, vinyl asbestos, asphalt • Rubber heels and soles • Adhesives • Wire insulation • Light colored molded goods • Athletic goods • Extrusions and profiles • Mechanical goods • Conveyor belting • Tubing and hose

Get the full story on AMOCO Resin 18 from your Amoco Chemicals representative. Use the coupon to request sample.

AMOCO CHEMICALS

AMOCO CHEMICALS

AMOCO CHEMICALS CORPORATION
Department 5390
130 East Randolph Drive
Chicago 1, Illinois

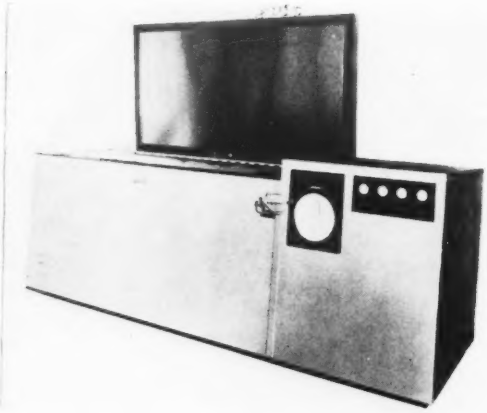
☐ Please send me a sample of AMOCO Resin 18.
☐ Please ask a representative to call.

NAME_____

POSITION_____

COMPANY_____

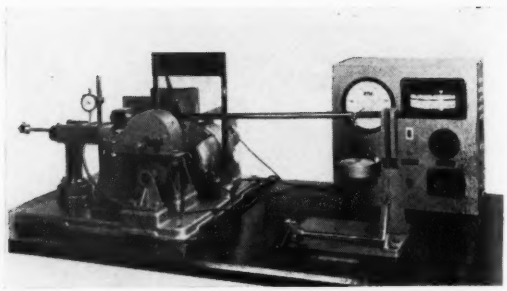
ADDRESS_____



Webber environmental chamber

Low-Temperature Box

Webber Mfg. Co., Inc., Indianapolis, Ind., has introduced the first environmental chamber, with a mechanically refrigerated closed system, able to reach —250° F., Model WT-8-250. It is designed to make possible many new applications for low-temperature work in research, processing, and production. The same system may be incorporated in other Webber standard chambers or in custom models.



Rotary power loss machine

Rotary Power Loss Unit

Testing Machines Inc., Mineola, N. Y., is marketing the Dunlop rotary power loss machine, which measures modulus, resilience, energy loss under constant load, energy loss under constant deformation.

The test specimen is a rubber wheel four inches in diameter by ¾-inch wide bonded to a metal hub. It is mounted on a pivoted shaft; so it can be brought in contact with a revolving steel cylinder.

The deflection of the specimen is measured by a gage while the steel drum is driven at a constant speed. The energy loss is determined by the angular deflection of the stator of the motor which drives the steel drum.

ANNOUNCEMENT

WE
PROCESS
ALL TYPES OF FABRICS
WITH
POLYETHYLENE

WE ALSO PROCESS
POLYPROPYLENE

TEXTILE PROOFERS, INC.

193 CULVER AVE. JERSEY CITY 5 N. J.

MORE THAN A QUARTER OF A CENTURY EXPERIENCE

New Westinghouse digital draw-speed indicator instantly reports precise strip process speeds and speed differentials

Immediate knowledge of speed differentials, surface speeds, section speeds, speed ratios, improper slack, and drift is vital to improved product quality, uniformity, and output in the strip process industries.

The new Westinghouse digital draw-speed indicator has been designed to meet your accurate process speed requirements. This digital instrument measures surface speeds, speed difference between sections, and speed ratios between sections with accuracies of .1 foot per minute or 1 foot per minute. The completely transistorized digital indicator is entirely free from drift and retains its initial accuracy indefinitely.

This versatile product continually monitors speeds and draws, allowing fast location and trouble shooting of the causes of machine variations. In addition, it isolates the source of trouble to either regulator or mechanical problems.

It provides information that eliminates trial-and-error machine set-up. It permits the operator to accurately set up the ideal speed or draw on any given machine section, based on recorded data from previous runs.

Already proven in the paper and plastics industries, this new development is well suited to other strip process industries such as aluminum, steel, textile and rubber.

For more information, contact your Westinghouse representative or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. *You can be sure . . . if it's Westinghouse.*

J-40540

Westinghouse

Industrial Utility Presses

A new line of hydraulic ram-type or guided-platen industrial utility presses has been introduced by Hannifin Co., Des Plaines, Ill.

These utility presses have structural steel frames which meet NMTBA deflection standards and are available in 25-, 50-, 75-, and 100-ton capacities with a choice of 24- by 24-inch or 36- by 24-inch platens.

The presses feature a wide selection of standard components to meet preset requirements of frames, working forces, speeds, circuits, controls, and power sources.

Fabric Wrinkle Detector

Mason Instrument Co., Inc., Mamaroneck, N. Y., has developed a special photoelectric-relay control system that detects wrinkles in the production of rubberized fabrics. The system halts production until the wrinkles are eliminated. The adjustable scanning beam is very sensitive and can detect very small wrinkles over a 10-foot width of fabric. The equipment can be adapted for most flat-sheet production operations.

Packaged Vacuum Unit

Schutte & Koerting Co., Cornwells Heights, Pa., has introduced a compact packaged Hydro-Steam unit reputed to produce vacuum quickly and at low cost.

Available in single-stage to five-stage models for any vacuum down to 25 microns Hg absolute, SK Hydro-Steam units are claimed to be equally effective in intermittent or continuous use. Two advantages cited are: easy installation due to self-contained units requiring a minimum of connections, and simplified maintenance, resulting from the use of jet apparatus without moving parts. According to the manufacturer, the efficiency of SK Hydro-Steam units is not affected by impurities, such as is the case with a mechanical system.

SK Packaged Hydro-Steam units are said to be especially useful in process operations in which a sealed system is required, and where noncondensables are at a minimum. These units are also employed as back-up or stand-by units to diffusion pumps.

For complete information, send for Bulletin 5H-HS, Schutte & Koerting Co., Dept. JA-39, Cornwells Heights, Bucks Co., Pa.

(*Continued on page 30*)

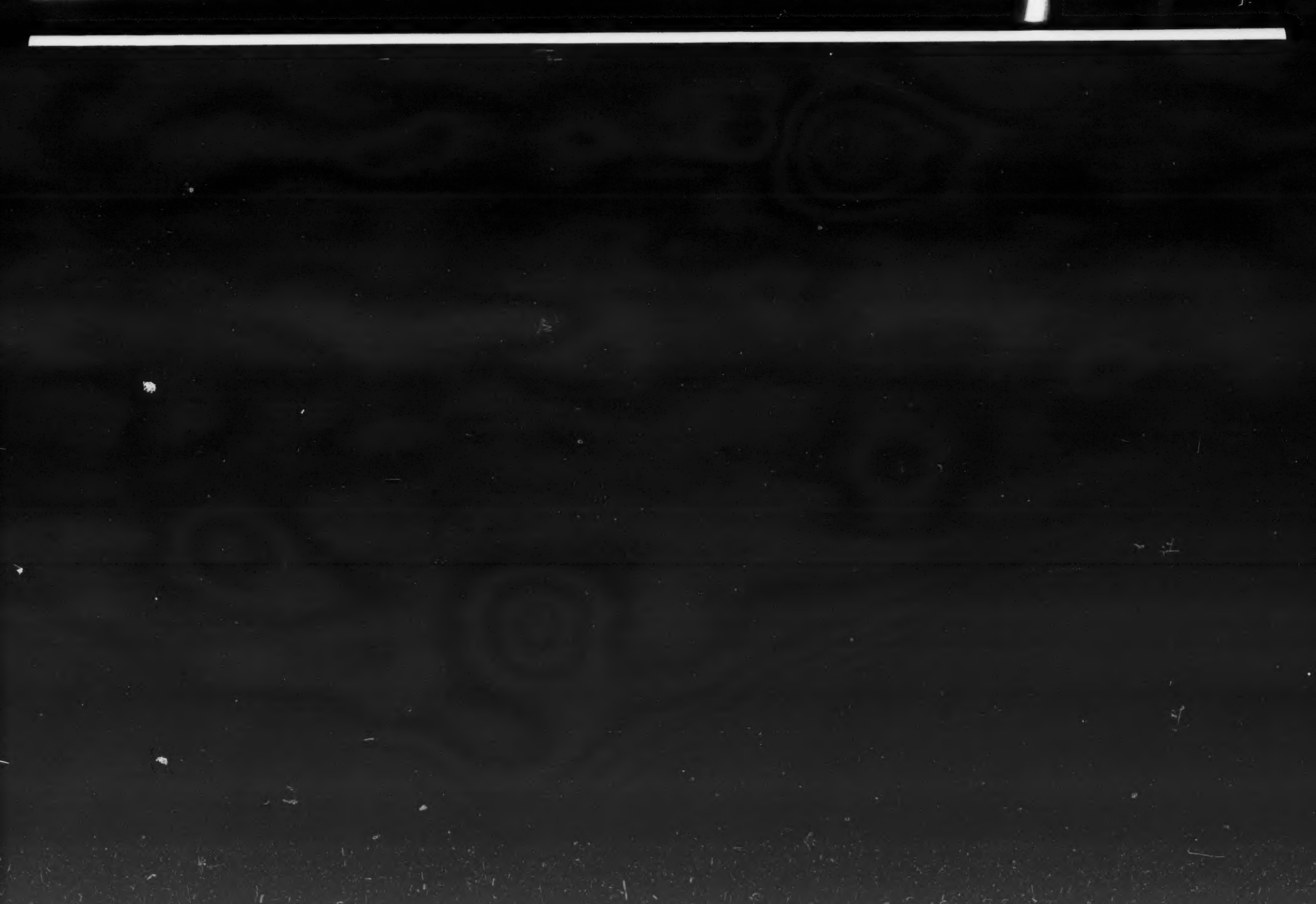
Manufacturers of CANARY LINERS

Mildew-proofing *and* Flame-proofing Cotton Fabrics as per Government Specifications. *Write or Wire for Samples and Quotations.*

WEST COAST AGENT
R. D. Abbott Co., Inc.
5268 Alhambra Ave..
Los Angeles 32, California.

CANADIAN AGENT
Columbian Carbon (Canada) Ltd.
Carbon Black and Pigment Division
7 Superior Avenue
Toronto 14, Ontario, Canada

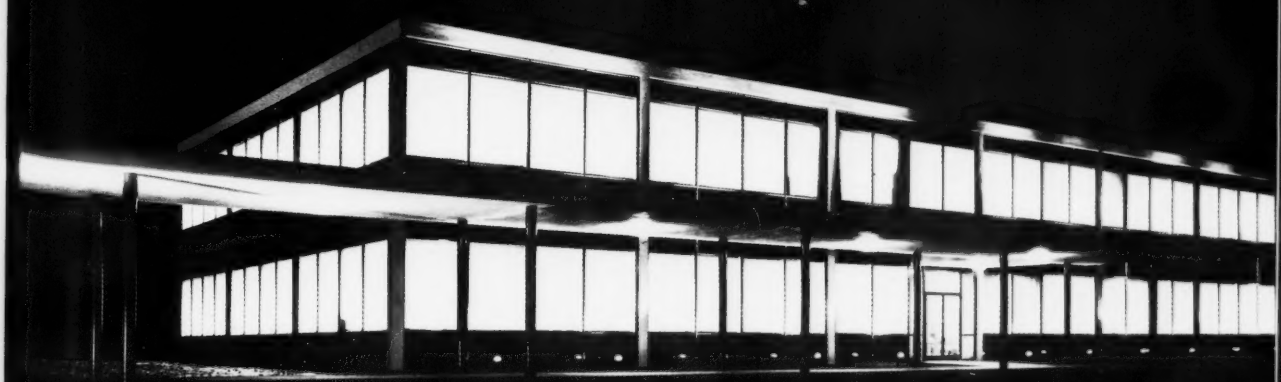
J. J. WHITE Products Co.
7000 UNION AVENUE
CLEVELAND 5, OHIO



SEASON'S GREETINGS

As lengthening shadows across the winter-bound land tell us that another year is drawing to a close, we at Copolymer pause during the joyous holiday season to extend Christmas greetings and sincere best wishes to you and yours for the year to come.

Copolymer



COPOLYMER RUBBER AND CHEMICAL CORPORATION, BATON ROUGE, LOUISIANA

HYDROSULFITES

SULFOXYLATES

for the most diverse manufacturing processes

Whether you use these chemicals as reducing agents or bleaching agents, you will like the high quality that Nopco builds into them and the service that accompanies them. Better laboratory control, better production control combine to give you better performance. And now, with a vastly increased staff, we are in a position to serve an ever-broadening group of industries.

Hydrozin®

- Stripping agent for wool and synthetics
- A component of the oxidation-reduction pairs used in emulsion polymerization of polyvinyl acetate

Sodium Formaldehyde Sulfoxylate (AWC)

- Redox component for emulsion polymerization of synthetic rubber
- Used for application printing of vat colors and discharge printing on all textiles
- Stripping agent for acetates and woolens

Sodium Hydrosulfite

- A bleaching agent for kaolin clays
- Also a most economical agent for bleaching mechanical pulps
- A reducing agent for vat dyeing
- An oxygen scavenger in synthetic rubber polymerization

NOPCO CHEMICAL COMPANY

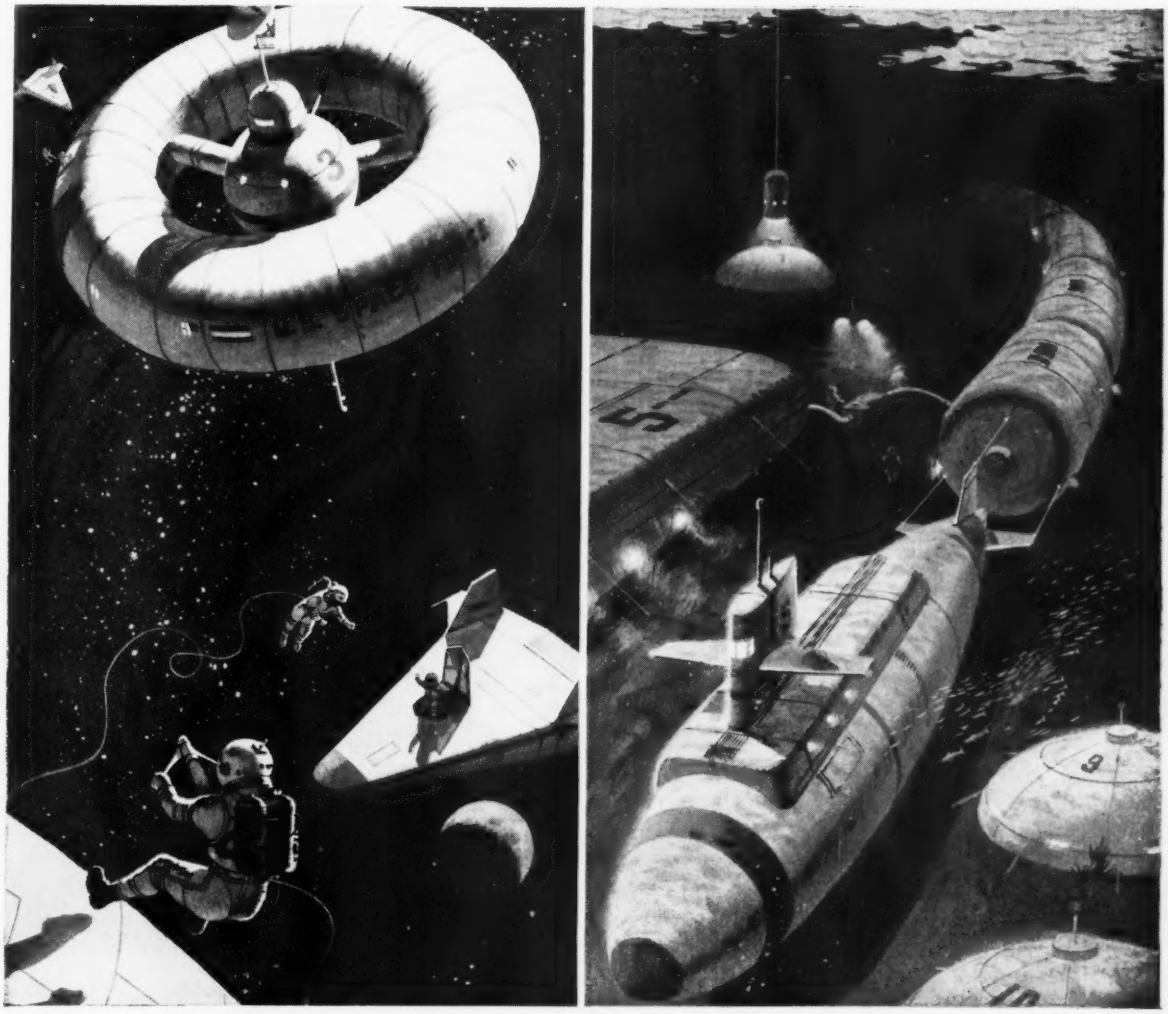
NOPCO®

60 Park Place, Newark, N.J.

Plants: Harrison, N.J. • Carlstadt, N.J. • Richmond, Calif. Cedartown, Ga. • London, Canada • Mexico, D.F. • Corbeil, France • Sydney, Australia

Manufacturing Licensees Throughout the World

High road or low road . . . fabrics figure as key structural material



On the drawing board: orbiting space stations (top) fold to fit in rocket nose cone, inflate with gas. Astronauts are protected by space suits of special coated fabrics.

In the development stage: fabric fuel tanks (left) can be anchored or towed by submarine for underseas storage. Right: fabric pressurized hemispheres for on-the-bottom mining.

Problem: build orbiting space stations—durable, yet light and compact for stowing aboard rockets. *Problem:* build giant tanks to store fuel deep in the ocean—light enough for towing, strong enough for long-term anchorage. *Solutions* under consideration: specially engineered fabrics.

High strength-to-weight ratio, flexibility, portability, toughness: these are the basic properties which make fabrics indispensable in exploration. And the special properties which can be engineered into fabrics are nearly endless.

Since the days of clipper ships, Wellington Sears fabrics have seen service around the world. Even *beyond* it . . . recently a Wellington Sears fabric was tested successfully in a drag balloon designed to slow space vehicles in orbit. Hardly a need exists for which we have not developed and produced fabrics—in cotton, man-made fibers and countless combinations of the two.

Call on our research facilities and staff of industrial-fabric specialists for sound technical assistance on any project involving fabrics. For a copy of illustrated booklet, "Fabrics Plus," write Dept. H-12.

WELLINGTON SEARS

FIRST in Fabrics for Industry

WEST POINT PEPPERELL TEXTILES

For mechanical goods, coated materials, tires, footwear and other rubber products

Wellington Sears Company, 111 West 40th Street, New York 18, N.Y. • Akron • Atlanta • Boston • Chicago • Dallas • Detroit • Los Angeles • Philadelphia • San Francisco

"When SAF carbon black appeared on the industrial scene nearly a decade ago, it created considerable excitement because of its promise to provide increased tread wear. But it soon became obvious that SAF was ahead of its time. Then, additional black development turned up ISAF, an intermediate between HAF and SAF, which is still the stepping-stone to original SAF promise.

"In the foreseeable future, we shall find solutions to the essential problems inherent in the use of furnace blacks having extremely fine particle size. This will permit SAF to fulfill its potential as the truly superior carbon black for tire treads and other end uses requiring maximum abrasion resistance."

DAVID C. WILLIAMS

Manager, Carbon Black Development
United Carbon Company

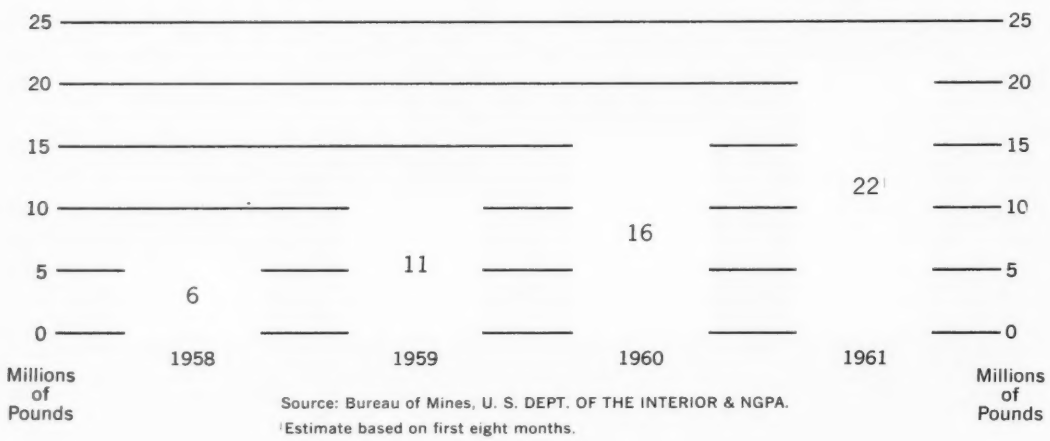
A Product in Perspective

SAF Carbon Black

Prior to 1943, the available furnace blacks were largely, or wholly, gas blacks. Then, 19 years ago, the first oil-furnace product—fast-extrusion furnace (FEF) black, also known as medium-abrasion furnace (MAF) black—appeared. Immediately and unanimously the industry's opinion held that oil blacks, namely FEF, would *not* prove successful because the properties they imparted to rubber were so vastly different from those provided by gas blacks.

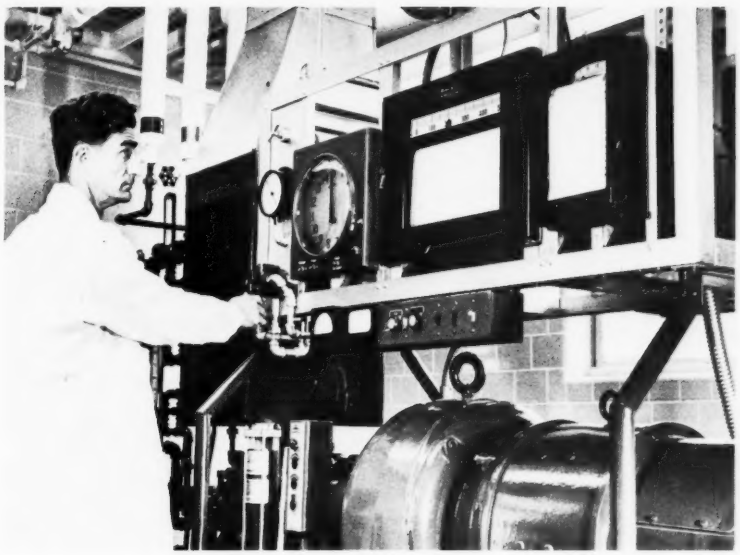
But pressure of the World War II industrial effort opened the door to oil blacks when ingenious compounders found a sizeable, practical application for FEF. They used it as a diluent for other types of carbon black then being employed in GR-S (now called SBR, styrene/butadiene rubber). Up until that time, compounders utilized chiefly gas-furnace blacks and channel blacks, but these gave processing difficulties in the early synthetic rubbers. Substituted for a portion of the other blacks, FEF imparted to existing formulations some of its own characteristic advantages: fast extrusion, exceptional smoothness, and substantial reinforcement.

For four years, FEF was the only oil-black available. Then, in 1947, high-abrasion furnace (HAF) black appeared. This second member of the oil-black family gradually displaced channel black in rubber compounds demanding increased abrasion resistance. It became especially popular in tire compounding



Source: Bureau of Mines, U. S. DEPT. OF THE INTERIOR & NGPA.

[1]Estimate based on first eight months.



United Carbon's instrumented banbury allows exact temperature and power consumption analyses. Studies of various compounds as well as controlled compound mixing for process evaluations permit complete material-mixing case histories.

with styrene/butadiene elastomers which had by that time reached commercial status. And it still serves as a basic standard of comparison for tire tread wear.

SAF Came with Built-In Problems

In 1952, super-abrasion furnace (SAF) black made its debut. This product, with its very small particle size, resulted from efforts by the industry to take another giant step forward—a step as big as the one from FEF to HAF. Early tests had proven that SAF did indeed give significantly increased tread life when substituted for HAF in cold SBR.

Unfortunately, though, SAF possessed three major difficulties. For one thing, it processes hot—this means overheating during the mixing operations. For another thing, it is difficult to disperse—the small highly surface-active particles of SAF black don't mix readily or uniformly into dry rubber. Third, it causes severe cracking in service—straight SBR tread stock, processed without today's delayed-action accelerators, cracked badly although it did wear longer than with other available blacks.

These built-in problems caused the rubber industry to back away from this potential advance. The urgency didn't exist, a decade ago, to *make* the new black work, as it had existed a few years earlier when HAF came on the scene. At that time, incompatibility of channel black with cold SBR made it necessary to pursue exhaustively the secret of how to use HAF. The same sort of basic practical need didn't obtain with SAF, since HAF already worked well enough for most uses.

Then the carbon-black industry came forth with an intermediate super-abrasion furnace (ISAF) product. This was not the giant step ahead promised by SAF, but was an advance over HAF.

SAF Today

Many, if not all, of the earliest tests with SAF were made with SAF as an outright replacement of HAF. This alone helped SAF to "strike out." Experience has since demonstrated what should have been obvious —SAF is not HAF and cannot be used in the same manner.

Black masterbatching at the latex plant has done

At United Carbon, compound studies are made on present-day SAF to further development of this promising material. Here, the Mooney Shearing Disc Viscometer is employed to study viscosity, scorch, rate of cure and cure time of an experimental SAF compound.

much to overcome the dispersion problem that came with SAF. Latex masterbatching – adding a predispersed slurry of the carbon black and oil to the SBR latex–has also avoided the heat problem associated with mixing and processing SAF in dry rubber. These solutions added immeasurably to the utility of SAF.

Present consumption of SAF is limited, but vital and specific. Today's use-pattern results from laborious experience and painstaking efforts with SAF in end products destined for severe service applications. These need better properties than any other existing carbon black provides. Consequently, SAF can now be found in a number of items requiring the very best in abrasion resistance–e.g., butyl tire treads, heavy-service covers for conveyor belts, super-quality camelback, some natural rubber tire treads, and track blocks for military vehicles.

SAF Tomorrow

Though SAF gives longest wear to straight SBR tread stocks, it does cause increased cracking. In oil-extended SBR, this tread-cracking problem disappears but, at the same time, wear declines significantly. In spite of considerable efforts on the part of industrial consumers, no practical explanation has yet been found. Why?

Perhaps these efforts have consisted largely of simple substitution formulations. And perhaps more imaginative approaches are called for. Bold, new formulation and processing techniques on the consumers' part may make today's SAF more widely usable. These approaches will include detailed investigations of polymers, loading levels, accelerators and accelerator combinations, sulfur levels, softness, and the economics of compounding.

Perhaps, too, carbon black manufacturers themselves will have to learn more about the fundamental characteristics of present-day SAF–about the interrelationships of physical properties of the black and their effects upon compounds, and about modifying SAF by developing new production techniques. Is the particle size and particle-size distribution proper in commercial SAF today? Is the structure level optimum? How should SAF be modified to be most useful?

The need is clear for a step forward beyond ISAF, toward the early promise of SAF. Maybe such an in-between product is the immediate answer. Or maybe a new SAF will appear soon to solve the problem. But in any case, SAF lights the way–its high quality forms a goal, its difficulties create a challenge. The traditional cooperation of producers with consumers will determine which way industry's needs for the values of SAF will be met.

PROPERTIES*	EPC	SAF	ISAF	HAF
Particle Diameter, millimicrons	30.0	24.6	30.7	45.2
Surface Area, square meters/gram	106.8	127.2	101.8	69.2
Volatile Matter, % by weight	5.7	1.92	1.45	1.63
Ash, % by weight	0.05	0.27	0.50	0.24
pH	4.3	9.6	9.1	9.2
Iodine Number, milligrams/gram	75.0	140.0	125.0	76.1
Tint Comparison	364	400	385	366

*Property values are based on United Carbon and/or ASTM test procedures. Values given are typical.

UNITED CARBON COMPANY, INC.
410 PARK AVENUE, NEW YORK 22, N. Y.
A Subsidiary of United Carbon Company
AKRON CHICAGO LOS ANGELES
BOSTON HOUSTON MEMPHIS
In France: UNITED CARBON FRANCE, S.A.

UNITED
CARBON

CLIMCO PROCESSING means perfect separation for cutting operations

Nothing beats perfection, but Climco Processing will match it every time! Here's how you can avoid production headaches, save time at the bias cutter and cutting table – use Climco Liners that can be readily peeled from stock without sticking. Since 1922, the rubber industry has depended on Climco for superior separation, consistent quality and reliable delivery.

Climco Processing gives you many other profitable advantages. Liner life is greatly increased, tackiness of stock is preserved and gauges are more easily maintained. Latitude in compounding is increased, lint and ravelings are eliminated and horizontal storage is facilitated. Your own experience will prove the superiority of Climco Liners . . . order now for a trial in your plant.

THE CLEVELAND LINER & MFG. CO.
5508 Maurice Ave. • Cleveland 27, Ohio • U.S.A.
Cable Address: "BLUELINER"

FREE BOOKLET
Send for the complete story today on Climco Processing.

CLIMCO
PROCESSED LINERS AND LINERETTE INTERLEAVING PAPER

Chemical Division
GENERAL
THE GENERAL TIRE & RUBBER CO

Gentro-Jet's high quality and superior dispersion are evidenced by its excellent die conformity . . . thus, you get a better end product, plus the bonuses of easy and rapid processing at lower cost than by dry mixing. General Tire's steam-whipped black masterbatch, Gentro-Jet, is available in a variety of compositions to meet your every need. It's easy to handle, and it also eliminates the mixing problems common when loose black is involved. Switch to Gentro-Jet now, and reap its benefits!

GENTRO-JET

puts extra quality into tread rubber

GENTRO-JET BLACK MASTERS OFFER

- *Economy in shipping, storage and handling*
- *Easy, clean handling • Swift processing*
- *High gloss, high density extrusions*
- *Superior road wear*

THE GENERAL TIRE & RUBBER COMPANY
CHEMICAL DIVISION, AKRON, OHIO

Chemicals for the rubber, paint, paper, textile, plastics and other industries: GENTRO SBR rubber · GENTRO-JET black masterbatch · GEN-FLO styrene-butadiene latices GEN-TAC vinyl pyridine latex · GENTHANE polyurethane elastomer · VYGEN PVC resins · KURE-BLEND TMTD masterbatch · KO-BLEND insoluble sulfur masterbatch

Creating Progress Through Chemistry

(*Continued from page 20*)

Rotovisco rotating viscometer and accessories

Rotating Viscometer

The Haake Rotovisco, a new rotating viscometer featuring an unusually wide viscosity measuring range 5 x 10^{-3} to 4 x 10^{7} poises, and a highly adaptable building block design, has been introduced by Brinkman Instruments Inc., Great Neck, L. I., N. Y. The Instrument consists of a control cabinet, flexible cable, measuring head, and standard measuring elements. Rotors of steel, nickle/brass, or plastic are available. A constant-temperature circulator with a range of −60 to 300° C. and/or a recorder are optional accessories.

The Rotovisco offers exact duplication of practical or operating conditions, as well as cup and bob, and plate cone measuring systems. Instant determination of viscosity without the use of calibration curves may be accomplished by simple multiplications of scale value, speed, and calibration factor. A total of 30 different speeds with a range 0.03 to 486 r.p.m. can be selected by means of two instantly interchangeable gears which attach to the measuring head. Small limits of error result in excellent reproducibility, with 0.5 to 4.0% total accuracy.

Non-Pulsating Pump

"Cheminert" pumps which produce accurate, non-pulsating flowrates of liquids and slurries are available from G. F. Bush Associates, Princeton, N. J. These pumps are designed for use with corrosive materials or materials which must not be contaminated, such as blood. The pumps can be used for continuous use, and the output is adjustable through a dial showing liters per minute.

Several models with various flowrates and suitable for specific materials are available.

Magnetic Thermocouple

The Monitemp Mark IV, featuring a new thermocouple design reported to offer quick and accurate temperature readings of any magnetic surface, is offered by The Advanced Products Co., North Haven, Conn.

The temperature-sensing probe fits through the center of a powerful Alnico V magnet and is spring loaded to insure positive contact with the surface being tested. The stainless-steel braided sheath is available in any length; either Chromel-Alumel or Iron-Constantan thermocouples; and with indicating and/or recording meters. Temperature measurements on pipes, ovens, molding machines, foundry equipment, and heat treating apparatus are some applications.

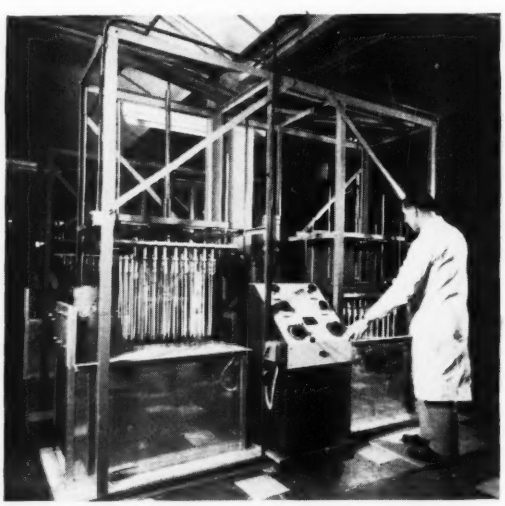
Melt Index Apparatus

Custom Scientific Instruments, Inc., Kearny, N. J., offers an instrument to measure the rate of extrusion of a thermoplastic through an orifice of specified length, and diameter under prescribed conditions and pressure in accordance with ASTM Specification D 1238.

Automatic Latex Dipping Machine

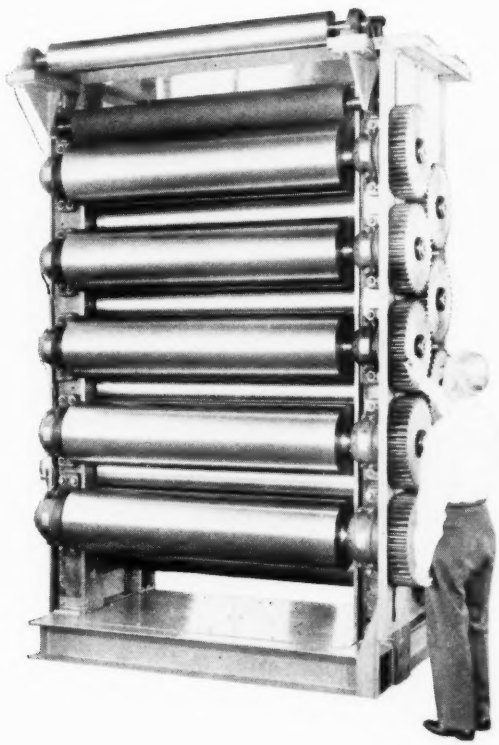
This automatic, twin-bank latex dipping machine was designed and manufactured by Lionel Hook & Sons Ltd., Stroud, Gloucestershire, England. The equipment shown is for surgical drainage tubes and is capable of withdrawing the metal formers at precisely controlled rates of as little as $\frac{1}{16}$-inch per minute.

The firm, specialists in the manufacture of PVC and latex dipping equipment, exports many machines and is currently expanding its operation.



Latex dipping machine for surgical tubes with automatically controlled twin banks

HOLDBACK & PULL ROLL STANDS



SHELLS OF CENTRIFUGALLY CAST MEEHANITE

SHAFTS OF HIGH GRADE STEEL DESIGNED TO HAVE LOW FIBER STRESS

MAXIMUM DEFLECTION OF .006" WHEN HANDLING 60" WIDE FABRIC AT 30,000# TENSION

ROLL FACES GROUND TO PREVENT POSSIBLE ABRASION OF FABRIC

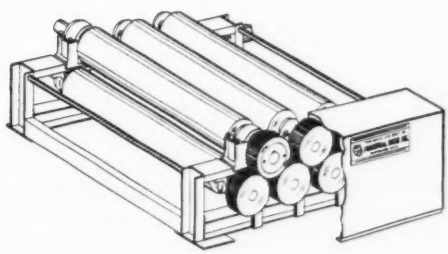
HIGH COEFFICIENT OF FRICTION BETWEEN ROLL FACE AND FABRIC MINIMIZES SLIPPAGE

CASE HARDENED GEARS GIVE MAXIMUM LIFE

10 ROLL STAND

(GEAR GUARDS REMOVED TO SHOW GEARS)

COMPACT, VERTICAL CONSTRUCTION CUTS FLOOR SPACE REQUIREMENTS



MANY ROLL ARRANGEMENTS AVAILABLE FOR 500 TO 30,000# TENSION

OUR MANY SATISFIED CUSTOMERS CAN CONFIRM THE RUGGEDNESS AND RELIABILITY OF I.O.I. HOLDBACK AND PULL ROLL STANDS IN HEAVY DUTY SERVICE

INQUIRIES INVITED

INDUSTRIAL IOI OVENS, INC.

13813 TRISKETT ROAD CLEVELAND 11, OHIO

Sales Offices in: Chicago • Boston • Akron • Atlanta • Houston • Los Angeles • San Francisco • Toronto

CARBON BLACK WHERE YOU WANT IT

It makes little difference where in the world you are—from Bakersfield to Bordeaux—you are assured of "next door" carbon black service from Witco-Continental's international network of production facilities and sales offices.

Witco-Continental's unique system of "Unified Control" makes this possible. Wherever you are, your requirements are handled by one integrated world organization, to give you the benefits derived from continuous production and quality control, advanced packaging and shipping techniques —without waste motion.

And now, with capacity increased by fifty per cent, Witco-Continental's service is even more readily available —wherever you want it.

WITCO CHEMICAL COMPANY, Inc.
122 East 42nd Street • New York 17, N.Y.
CONTINENTAL CARBON COMPANY
4848 Guiton, Houston 27, Texas

and Montreal, Canada • London and Manchester, England • Glasgow, Scotland • Rotterdam, The Netherlands • Paris, France

ESTER GUMS All Types. Glycerine and pentaerythritol esters of gum, wood, polymerized wood, hydrogenated wood, dimerized wood and tall oil rosins.

PURE PHENOLIC RESINS Heat Reactive, Novolac Type, Thermoplastic and Terpene. A wide variety of resins intended primarily for tackifying and reinforcing neoprene, acrylonitrile and other synthetic elastomers.

PLASTICIZERS Polymeric and Chemical. A wide range of polymeric and monomeric plastjcizers and epoxidized oils for the compounding of neoprenes, nitriles, and other synthetic elastomers.

CHEMICALS Phthalic anhydride, maleic anhydride, pentaerythritol, formaldehyde, methanol, phenol and phenol derivatives.

Creative Chemistry . . Your Partner in Progress

REICHHOLD

REICHHOLD CHEMICALS, INC., RCI BUILDING, WHITE PLAINS, N.Y.

new materials

Silicone Rubber Foam

A silicone rubber foam, Silastic RTV S5370, that vulcanizes at room temperature has been announced by Dow Corning Corp., Midland, Mich.

The reaction to produce the foam begins immediately after the addition of a catalyst and is completed within three minutes. Parts can be handled after an additional two minutes, and maximum strength is obtained in about 24 hours. The reaction, when not confined, produces a foam of a sevenfold volume increase with a density of 10 pounds per cubic foot with a 10% closed-cell structure. The application time can be adjusted by varying the temperature of the base and/or the amount of the catalyst, and the density can be raised by increasing the confinement.

The RTV is a tan, low viscosity liquid (8,000 centipoises), with a specific gravity of 1.1 (77° F.) and a shelf life of approximately six month. The foams are said to be serviceable from —70 to 500° F. and to have good electrical properties. The material is suitable for "in place" foaming, and expected applications include thermal and vibration insulations, cushioning, and sealing.

Cyanaprene 4590, Urethane Rubber

Conventional molding equipment and techniques can be employed in the use of Cyanaprene 4590 urethane rubber produced by American Cyanamid Co., Bound Brook, N. J.

Cure conditions of 30 minutes at 270° F. or five minutes at 350° F. using 7.5-8.5 pph. Moca[1] are recommended. With Moca, 10 minutes at 270° F. are usually adequate to permit parts to be stripped from the mold without distortion. A postcure period of 16 hours at 212° F. or two weeks at room temperature is recommended for the development of maximum polymer properties. Pot life is 5-8 minutes at 221° F.

Typical properties under these conditions are: hardness (Shore A), 85-87; tensile, 6400 psi.; elongation, 690%; compression set (Method B at 20% deflection), 25%; 300% modulus, 1650 psi.; and compression modulus (at 20% deflection), 760 psi.

[1]Methylene-bis-orthochloroaniline, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

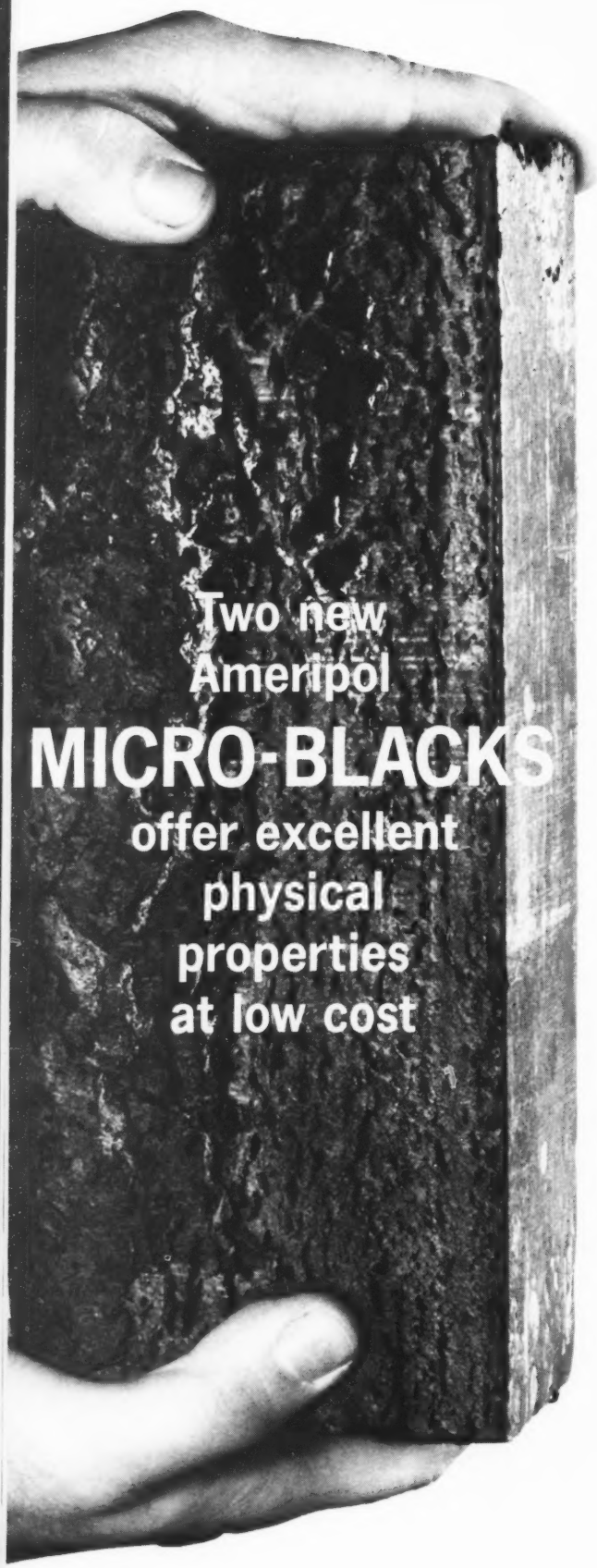
(*Continued on page 42*)

Costs also come down with Ameripol Rubber

These colorful stair treads take a steady pounding in busy buildings, such as schools, motels, offices. So they must be extra thick, resilient, and wear resistant. ■ In order to provide this quality at competitive prices, Johnson Rubber Company turned to one of the new Ameripol polymers developed by Goodrich-Gulf. It provides excellent properties—along with significant cost savings. Being easier to process than rubbers previously used, it has cut mixing time 15%, simplified molding operations, and reduced rejects to the vanishing point. ■ Goodrich-Gulf offers the broadest line of synthetic rubber polymers, backed by continuous product development and alert technical service. It's an excellent recipe for any rubber product manufacturer. For service contact Goodrich-Gulf Chemicals, Inc., 1717 East Ninth Street, Cleveland, 14, Ohio.

Ameripol
THE PREFERRED RUBBER

Goodrich-Gulf Chemicals, Inc.
WORLD'S LARGEST SOURCE OF SYNTHETIC RUBBER



Two new Ameripol MICRO-BLACKS offer excellent physical properties at low cost

Ameripol
THE PREFERRED RUBBER

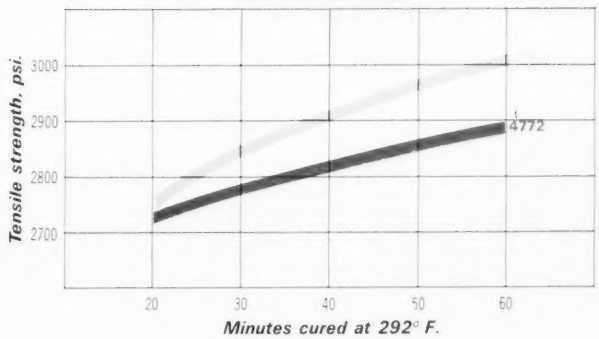
COMPOSITION OF MASTERBATCHES IS:

	Ameripol 4758	Ameripol 4772
Base Polymer Latex	100.0	100.0
Highly Aromatic Oil	62.5	62.5
ISAF Black	82.5	—
HAF Black	—	82.5
TOTAL	245.0	245.0
Specific Gravity (Calculated)	1.14	1.14

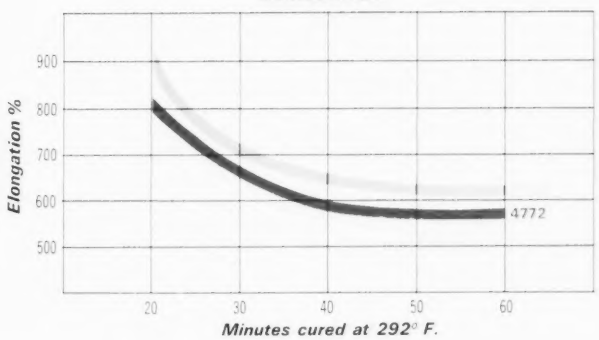
TYPICAL PROPERTIES
(Standard Test Recipe)

CHEMICAL		Ameripol 4758	Ameripol 4772
Volatile Matter, %		0.31	0.22
Ash, %		0.17	0.09
Mixed Acid, %		2.90	2.74
Soap, %		0.06	0.04
PHYSICAL	**Cure @ 292°F**	**Ameripol 4758**	**Ameripol 4772**
Tensile, psi	50′	3030	2980
Elongation, %	50′	660	710
Modulus @300%, psi	25′	630	640
@300%, psi	50′	1060	1050
@300%, psi	100′	1380	1320
Hardness, Shore A		61	58

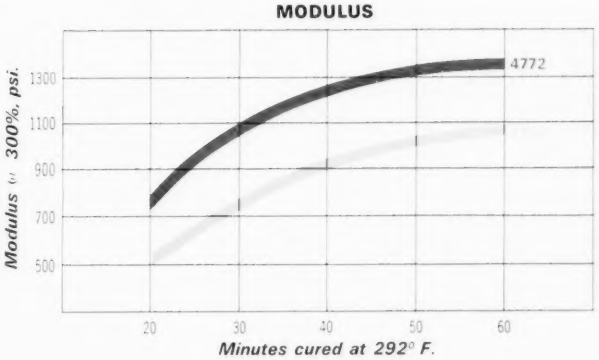
TENSILE STRENGTH



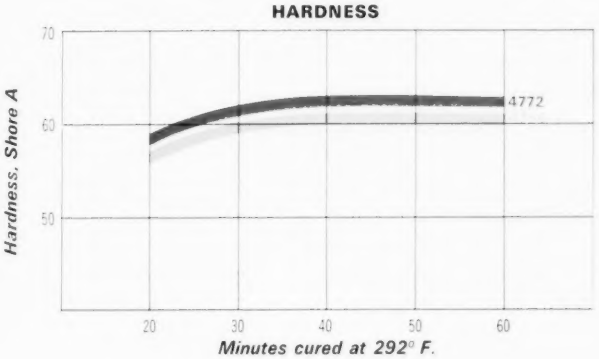
ELONGATION



MODULUS



HARDNESS



TEST RESULTS SHOW EXCELLENT PHYSICALS

Below are two typical tread recipes employing Ameripol 4758 and Ameripol 4772. Test results on these formulations show superior physical properties.

TEST RECIPE

	A	B
Ameripol 4758	150.75	—
Ameripol 4772	—	150.75
Zinc Oxide	3	3
Stearic Acid	1	1
Agerite Resin D	0.50	0.50
Resinex	5	5
Santocure	1	1
Sulfur	1.75	1.75
TOTAL	163.0	163.0

PHYSICAL PROPERTIES

	292°F	Ameripol 4758	Ameripol 4772
Tensile, psi	20′	2765	2735
	30′	2850	2785
	40′	2905	2755
	60′	3015	2890
Elongation, %	20′	900	820
	30′	705	665
	40′	645	585
	60′	635	575
Modulus @ 300%, psi	20′	515	765
	30′	670	1065
	40′	1000	1230
	60′	1075	1325
Hardness, Shore A	20′	57	58
	30′	60	61
	40′	61	62
	60′	61	62
Pico Abrasion		96.5	89
Compounded Viscosity, ML-4 @212°F		47.0	47.0
Mooney Scorch @250°F. T3		30+	30+

Goodrich-Gulf Chemicals, Inc.
WORLD'S LARGEST SOURCE OF SYNTHETIC RUBBER

Goodrich-Gulf offers widest range of styrene-Butadiene rubber polymers

AMERIPOL TYPES AVAILABLE

Hot polymerized types: 1000, 1001, 1002, 1006, 1007, 1009, 1011, 1012, 1013

Cold polymerized oil-extended types: 1703, 1705, 1707, 1708, 1710, 1712, 4700

Cold polymerized types: 1500, 1501, 1502, 1503, 1509, 1511, 4604

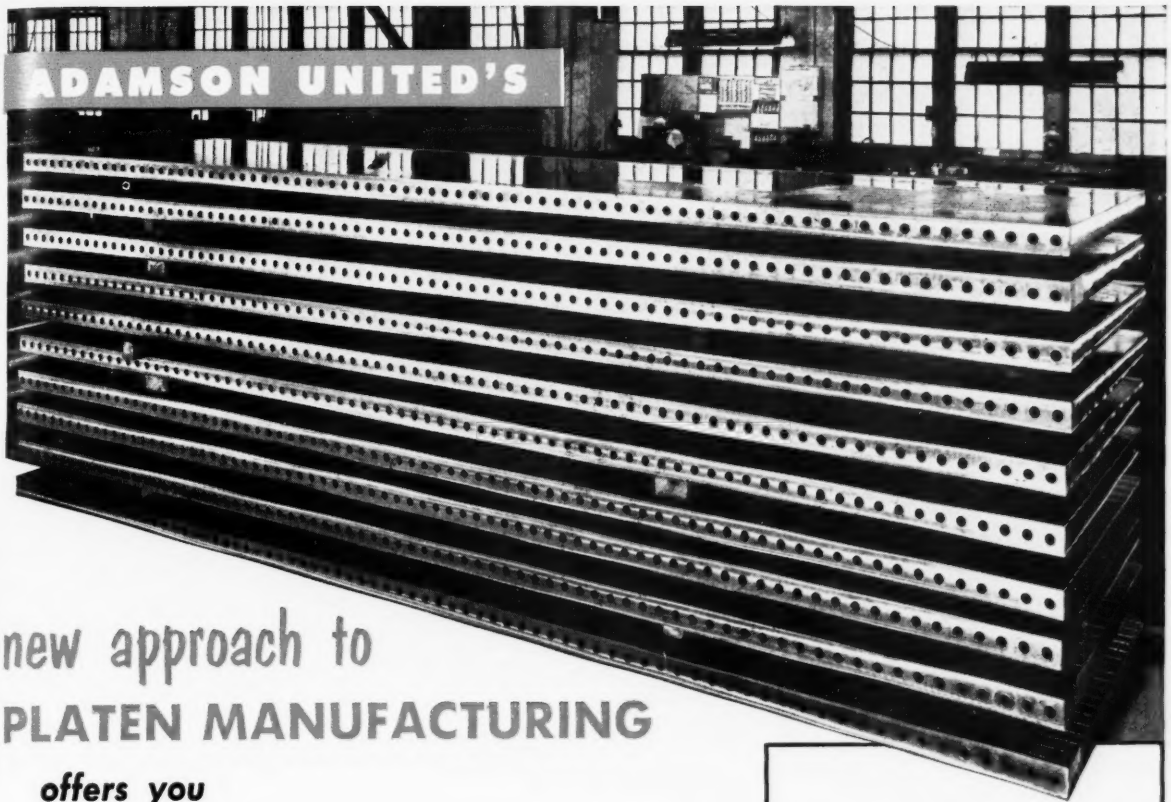
Cold polymerized black masterbatch types: 1605, 1606, 1608, 1609, 1610, 4651, 4658

Cold polymerized black masterbatch oil-extended types: 1805, 1808, 1809, 1816, 4756, 4758, 4759, 4760, 4771, 4772

Forms available: Pressed rubber bales, crumb rubber. Packaging to suit requirements.

Goodrich-Gulf Chemicals, Inc.

1717 EAST NINTH STREET • CLEVELAND 14, OHIO



new approach to PLATEN MANUFACTURING

offers you

- ***PLATENS AT LOWER COST***
- ***PLATENS OF GREATER UNIFORMITY***

To perform its job most efficiently, a platen must heat and cool *uniformly* over its entire top and bottom surfaces. Channels for circulation of heating and cooling medium must, therefore, be drilled precisely parallel to the surfaces. Obtaining this accuracy by conventional slow and painstaking methods of drilling has always been the most costly operation in platen making.

Adamson United's *new approach* to deep-hole drilling obsoletes these methods. Through use of a special, fully-automatic drilling machine designed and built by us, we perform this operation quickly and accurately, under "push-button" control. This new automatic unit, plus other specialized equipment, enables Adamson United to offer platens of greater *uniformity* in heating and cooling, and greater *accuracy* in parallelism of the plate. Platen sizes may be from 12" x 12", up to 120" x 40'.

Whatever *your* platen requirements . . . for new presses, as replacements, as individual heating plates, talk them over with us. Take advantage of Adamson United's higher platen quality, lower price, and quicker delivery.

Drilling circulation channels is done with cost-cutting speed and highest degrees of accuracy on our fully-automatic, multi-spindle gang drill. To meet users demands for platens manufactured on this equipment, we produced in record time over 5,000 square feet of platens . . . about 6 freight car loads, involving approximately 4 miles of drilled circulation holes.

Special Platen Designing

Adamson United Engineers are available to design special platens for your specific applications. Discuss your requirements with us.

7096

BASIC AND SPECIAL MACHINERY FOR THE RUBBER, PLASTICS, PLYWOOD, HARDBOARD, CHEMICALS-PHARMACEUTICALS — HEAVY TESTING EQUIPMENT FOR STEEL, AUTOMOTIVE AND AIRCRAFT INDUSTRIES.

ADAMSON UNITED COMPANY

730 CARROLL STREET, AKRON 4, OHIO

Subsidiary of United Engineering and Foundry Company

Plants: Pittsburgh • Vandergrift • Wilmington • Youngstown • Canton

WHAT CHANCE DOES THE WORLD HAVE?

The future of the world is in his hands. How well this youngster and his colleagues are educated may determine the course of history.

It is up to us to give the world the best possible chance by giving our future citizens the best possible college educations.

Even now some of our colleges are overcrowded. In less than ten years, the number of applicants will double.

To maintain the quality of our higher education, we shall have to recruit and train thousands of professors. We will also need many more classrooms with the most advanced educational aids, more comprehensive college libraries, new laboratories with the latest scientific equipment.

Some students are now excluded from college, or given inferior education, because we neglected to see the problem. We must act to provide our youngsters with more and better college facilities and the finest college training possible.

Help the college of your choice now. Help it to expand and improve its facilities and to pay its teachers the salaries their high calling deserves.

If you want to know more about what the college crisis means to you and what you can do to help, write for a free booklet to Higher Education, Box 36, Times Square Station, New York 36, N. Y.

HIGHER EDUCATION
KEEP IT BRIGHT

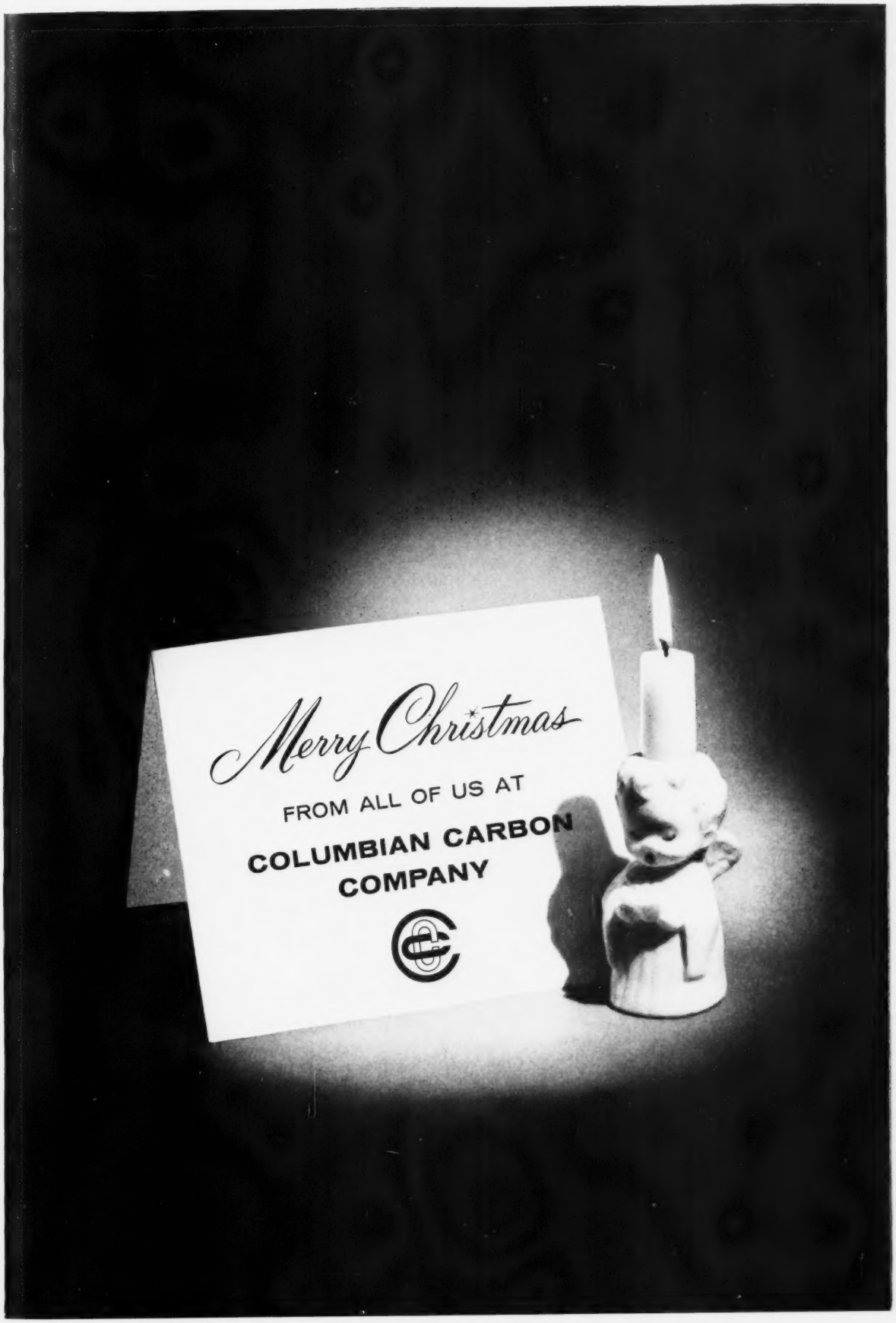
Sponsored in cooperation with The Advertising Council and the Council for Financial Aid to Education.

ADVERTISING COUNCIL PUBLIC SERVICE

COLUMBIAN CARBON COMPANY

380 Madison Avenue, New York 17, N. Y.

RLD


Merry Christmas
FROM ALL OF US AT
COLUMBIAN CARBON
COMPANY

Institution of the Rubber Industry

LONDON

You are invited to become a member.

The annual subscription is nominal and brings to members the bi-monthly TRANSACTIONS and PROCEEDINGS, which contain many original papers and important articles of value to rubber scientists, technologists, and engineers.

Members have the privilege of purchasing at reduced rates other publications of the Institution, including the *ANNUAL REPORT ON THE PROGRESS OF RUBBER TECHNOLOGY* (which presents a convenient review of advances in rubber), and a series of *MONOGRAPHS* on special aspects of rubber technology (monographs published to date deal with Tire Design, Aging, Calendering, and Reinforcement).

Further details are easily obtained by writing to:

SECRETARY
INSTITUTION OF THE RUBBER INDUSTRY
4, KENSINGTON PALACE GARDENS
LONDON, W. 8, ENGLAND

Telephone: Bayswater 9101

new materials

(*Continued from page 34*)

High Solid-Low Viscosity Latex for Paper Coating

The use of Dylex K-54W, an improved SBR latex, in a typical paper coating formulation for offset printing with 57.5% solids reduced the viscosity from 11,000 to 4,000 centipoises, and in a formulation for letterpress printing with 66% solids reduced the viscosity from 6,500 to 5,000 centipoises, according to Koppers Co., Inc., Pittsburgh, Pa. This reduction in viscosity allows the solid content of the coating to be increased while the desired viscosity is maintained, thus reducing the amount of water which must be removed.

The company reports that Dylex K-54W has outstanding mechanical stability plus good compatibility with pigments and starch, and that it can be used without stabilization. Improvements in the finished coated sheet include increased smoothness, high pick, and wet rub resistance, Koppers says. The company also claims that the latex leaves no unpleasant odor in the mill or any residual odor on the coated paper.

Urethane Bonding Agent—5H-192

Aluminum-to-aluminum bonds made with 5H-192 adhesive have passed immersion in oil at temperatures from −85 to 390° F. under a load of 80 psi. without failure, according to International Coatings Co., Compton, Calif.

The cured film is said to exhibit excellent chemical resistance, elasticity and impact resistance. The material will cure at room or elevated temperatures by reacting with atmospheric moisture. The cure can be accelerated by the addition of 1-2% catalyst. The adhesive is being used in electronic, aircraft and missile industries. Tests have indicated very strong bonds to steel, copper, magnesium, rubber, wood, glass, concrete, painted surfaces, nylon, vinyls, and other plastics.

Silicone Paste—RTV-77

RTV-77 is a white, all-purpose silicone rubber paste designed especially for high- and low-temperature industrial sealing, patching, and calking applications available from General Electric, Waterford, N. Y.

The material has thixotropic properties in the uncured state which prevent flow or sag which make it suitable for use in sealing undersides and gaps. At the same time, the flow properties of RTV-77, under pressure, make it particularly suitable to application from a calking gun. It will cure at room temperature, bonds to many metal and other surfaces, and is useful in a temperature range from below minus 75 to above 400° F.

Better!...from VELSICOL

When you use Velsicol Hydrocarbon Resins, rubber takes a fast TACK!

Velsicol X-30 is a light colored resin that can be used in light colored, pastel shade pigmentations. It is an ideal softener and tackifier that keeps stocks pliable and easy to process. Velsicol's X-30 permits the highest loadings with no loss in quality, yet it makes rubber tougher, longer wearing and *more profitable!*

Work with this man . . .
Your Velsicol representative, a qualified chemist who can help you make better products for less!

VELSICOL *for quality resins, constant in supply, stable in price!*

Try them now and discover their advantages for new production convenience and economy.

FREE X-30 test samples and literature

VELSICOL CHEMICAL CORP., 330 E. Grand Ave., Chicago 11, Ill. RW-121
INTERNATIONAL REPRESENTATIVE: VELSICOL INTERNATIONAL CORPORATION, C.A. P.O. BOX 1687 • NASSAU, BAHAMAS, B.W.I.

☐ Please send test samples of Velsicol X-30 Hydrocarbon Resins.
☐ Please send complete technical data. ☐ Have representative call.

NAME_____
COMPANY_____
ADDRESS_____
CITY_____ ZONE_____ STATE_____

VELSICOL

caught in the middle?

YOU CAN'T CONTROL THE "FLOW" OF TRAFFIC ON THE ROAD -- But -- YOU CAN CONTROL THE "FLOW" IN YOUR PLANT!

USE AQUAZINC KC CONCENTRATE

to separate sheet or slab stock and lubricate with perfect tack control

Aquazinc KC Concentrate, a highly concentrated zinc stearate dispersion, is applied as a spray or dip. It does the following for you:

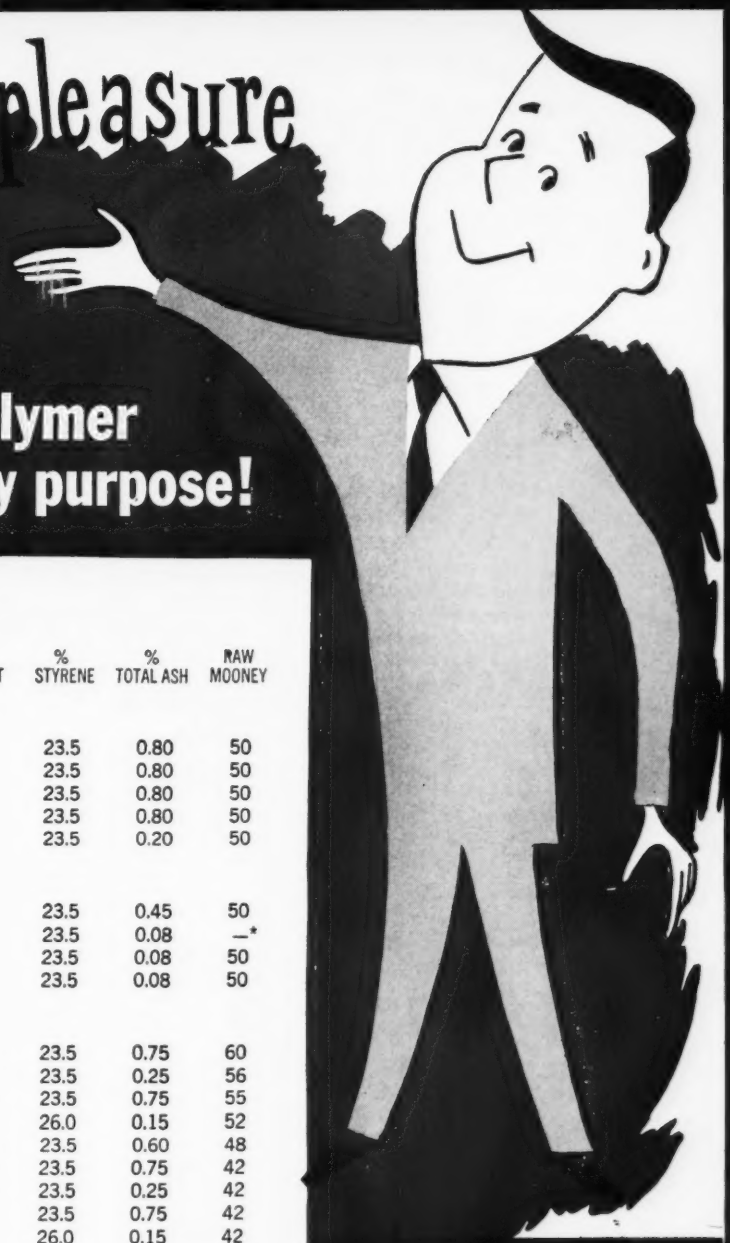
1. Eliminates the health and explosion hazards of dusting.
2. Eliminates the need for liners or cushions.
3. Gives smooth flowing stock plus perfect tack control (it's developed especially for sheet mill or slabbed stock).
4. Readily absorbed without affecting the stock.
5. Leaves a glossy, non-greasy finish that adds appearance appeal.

MANUFACTURERS OF CHEMICALS

BEACON Chemical Industries, Inc.

33 RICHDALE AVENUE, CAMBRIDGE 40, MASS.

What's Your pleasure in SBR?



ASRC has a polymer for every purpose!

DESIGNATION	TYPE	STAB.	EMUL.	COAG.	OIL TYPE-AMOUNT	% STYRENE	% TOTAL ASH	RAW MOONEY
			GENERAL PURPOSE TYPES					
1000	Hot	ST	FA	SA		23.5	0.80	50
1006	Hot	NS	FA	SA		23.5	0.80	50
1500	Cold	ST	RA	SA		23.5	0.80	50
1502	Cold	NS	FA/RA	SA		23.5	0.80	50
3106	Cold	NS	FA	GA		23.5	0.20	50
			WIRE AND CABLE TYPES					
1004	Hot	ST	FA	AL		23.5	0.45	50
1018	Hot	NS	FA	GA		23.5	0.08	—*
1019	Hot	NS	FA	GA		23.5	0.08	50
1503	Cold	NS	FA	GA		23.5	0.08	50
			OIL-EXTENDED TYPES					
1703	Cold	NS	FA/RA	SA	N 25.0	23.5	0.75	60
1708	Cold	NS	FA	GA	N 37.5	23.5	0.25	56
1712	Cold	ST	FA/RA	SA	HA 37.5	23.5	0.75	55
1713	Cold	NS	FA/RA	GA	N 50.0	26.0	0.15	52
1714	Cold	ST	FA/RA	SA	HA 50.0	23.5	0.60	48
3153	Cold	NS	FA/RA	SA	N 25.0	23.5	0.75	42
3158	Cold	NS	FA	GA	N 37.5	23.5	0.25	42
3162	Cold	ST	FA/RA	SA	HA 37.5	23.5	0.75	42
3163	Cold	NS	FA/RA	GA	N 50.0	26.0	0.15	42
			SPECIAL TYPES					
1009	Hot	NS	FA	SA		23.5	0.70	—†
1507	Cold	NS	FA/RA	SA		23.5	0.80	33
3015	Hot	NS	RA	SA		40.0	0.90	64
3100	Cold	NS	FA	GA		23.5	0.20	40
3105	Cold	NS	FA/RA	AL		23.5	0.50	33
3110	Cold	NS	FA/RA	AL		23.5	0.50	26
3115	Cold	NS	FA/RA	AL		40.0	0.60	33

Plus **FLOSBRENE**—The first commercially available **liquid** SBR and **CISDENE**—The new, improved-processing, stereo-specific high cis-polybutadiene rubber.

NS—Non-Staining **ST**—Staining **FA**—Fatty Acid **RA**—Rosin Acid **SA**—Salt Acid
GA—Glue Acid **AL**—Alum **N**—Naphthenic **HA**—Highly Aromatic
*—Cross-linked, Cpd. ML_4, 125 †—Cross-linked, Cpd. ML_4 120

THE ASRC MANUAL...
puts styrene-butadiene rubber facts at your fingertips. Available free on request to interested compounders.

AMERICAN SYNTHETIC RUBBER CORPORATION

GENERAL OFFICES AND PLANT • LOUISVILLE 1, KENTUCKY

JOSEPH W. HOLMES
Director of Sales
500 Fifth Avenue
New York 36, N.Y.

CHARLES W. CARROLL
Akron District Sales Manager
1130 2nd Nat'l Bldg.
Akron 8, Ohio

W. E. PIERPONT
Eastern District Sales Manager
500 Fifth Avenue
New York 36, N.Y.

W. ROBERT BULL
Ass't. Eastern District Sales Manager
500 Fifth Avenue
New York 36, N.Y.

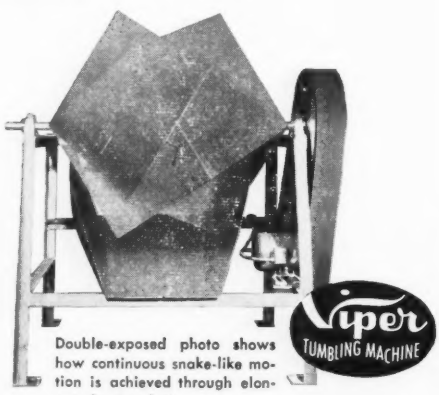
HAROLD O. GEORGE
Technical Service Manager
1909 Riverbend Pky.
Fremont, Ohio

WILEY W. CARR
Chicago District Sales Manager
38 S. Dearborn St.
Chicago 3, Illinois

GENE WEST
Southern District Sales Manager
P. O. Box 360
Louisville 1, Ky.

Save over 30% of TUMBLING TIME!

Here is a revolutionary new way to deflash rubber, plastics and synthetic products with greater speed and economy. Based on an amazingly simple principle, the "Viper" tumbling chamber is designed in an elongated cube shape to achieve a continuous snake-like action in which abrasive motion is constant throughout the tumbling process. The "Viper" does a more thorough deflashing job on less power, and saves fully thirty per cent of "normal" tumbling time. It has already proven itself through extensive application in Accurate Products' routine manufacture of more than 4,000,000 parts per week.



Double-exposed photo shows how continuous snake-like motion is achieved through elongated cube design.

- Instantly usable for dry-ice, normal and abrasive tumbling
- Greater load capacity than any other tumbler of comparable size
- Quality construction assuring longer life, requiring less maintenance

AVAILABLE IN SINGLE OR DOUBLE UNITS
DISTRIBUTOR INQUIRIES INVITED

Write for detailed illustrated information

ACCURATE PRODUCTS COMPANY, INC.

4650 Santa Fe San Diego 9, California

technical books

■

BOOK REVIEWS

"Russian-English Chemical Dictionary." First Edition, 1961. By Dr. Eugene A. Carpovich. Technical Dictionaries Co., New York, N. Y. Cloth, 8¾ by 6 inches, 352 pages. Cost $12.00 ($14.00 after 1/1/62).

This dictionary contains about 29,000 Russian entries in the following major classifications: chemistry, physical chemistry, chemical engineering, materials, minerals, fuels, petroleum, food industry, and pharmacology. Treated in the major subjects are words used in connection with theory, reactions, processes, equipment, products, rubber and other elastomers, plastics, synthetic resins, paper, leather, rocket propellants, and a great number of other associated topics. This special dictionary is intended for English-speaking scientists, researchers, engineers, editors, librarians, translators, students, and other workers who deal with Russian publications in the fields it covers.

"Rubber Red Book." Directory of the Rubber Industry. Fourteenth Edition, 1962. L. Sheckman, Editor. 8¼ by 11¼ inches, 816 pages. Palmerton Publishing Co., New York 1, N. Y. Price $15.00.

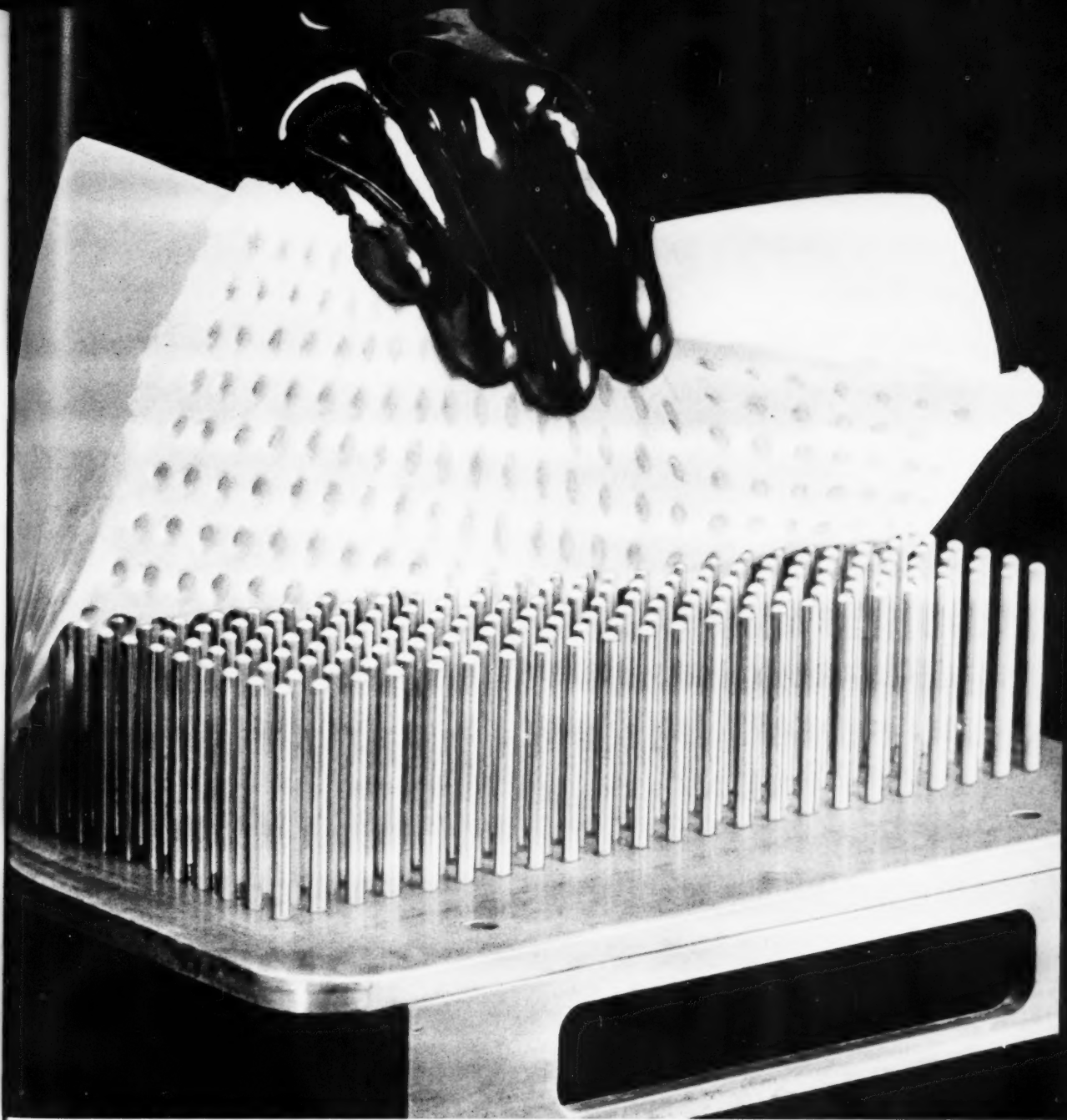
The basic format and size of this edition are the same as for the last one. In general, the same valuable information on the industry is presented, reflecting changes of the past year in the various sections. Rubber manufacturers in Puerto Rico have been added, and some sections have been shifted in position.

NEW PUBLICATIONS

"Reclaim in Tires and Mechanical Goods." Rubber Reclaimers Association, Inc., New York, N. Y. 6 pages. The booklet contains condensations of papers given in a panel discussion on reclaim before the Akron Rubber Group.

"Wabash Laboratory Presses." Wabash Metal Products Co., Wabash, Ind. 12 pages. Pictures and specifications of models are included.

(*Continued on page 52*)



Shell chemist removes CL-104 cushion from pin core mold. Read how this new latex can save you money.

SHELL ANNOUNCES A NEW SBR LATEX

Shell Chemical has developed an SBR latex that increases foam products yield as much as 15 per cent. Read about *new CL-104*—and how it can reduce your foam rubber costs. ➞

Shell's new CL-104 latex lets you reduce foam density as much as 15 per cent without sacrificing compression resistance

Shell Research has found a way to build greater strength into SBR latex. As a result, foam manufacturers can reduce the amount of rubber required in foam cushioning. Here's what this discovery can do for you.

SHELL CL-104 is a new SBR latex that can save you money. Here's why:

CL-104 is different from ordinary SBR latex. It's *stronger*. So much so, you can reduce the density of your present foam cushions as much as 15 per cent without losing compression resistance or tensile strength.

These facts are important to foam manufacturers. They mean *lower foam costs*. Because you can reduce foam density as much as 15 per cent, you use less rubber. Or, to look at it another way, with Shell CL-104 you can now make up to 15 per cent more cushions from every tank car of synthetic latex you buy.

Expands foam markets

Shell's CL-104 has dramatic possibilities of expanding your foam markets. In addition to lowering your foam costs, it now lets you offer the *comfort* advantages of *rubber latex foam* to consumers of lower-priced foam products.

No processing changes required

You may be wondering if your plant is set up to use Shell CL-104. Or if any elaborate processing changes are necessary.

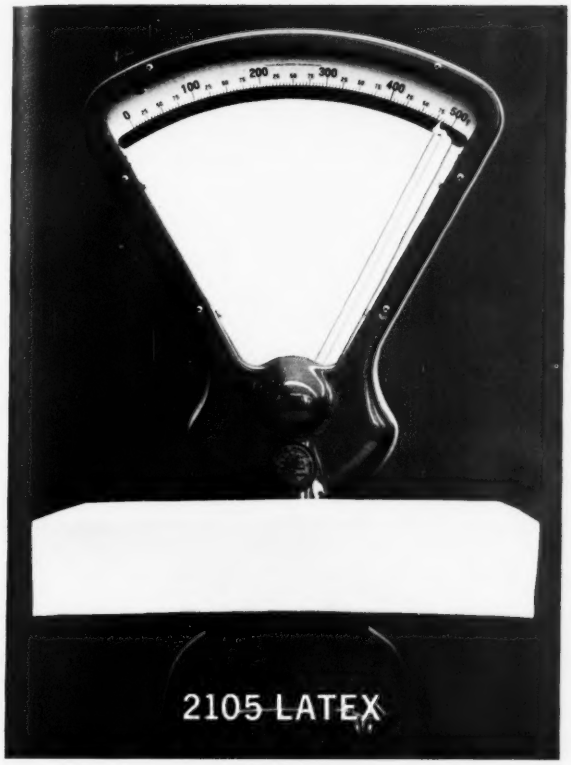
If you are presently using 2105 type latex, you can start using Shell CL-104 latex today. No special processing changes are needed.

Shell CL-104 froths readily, has equivalent gel time, vulcanizes and strips in the same manner as S-2105. It is compatible with natural latex and S-2105 in any ratio.

Handles easily

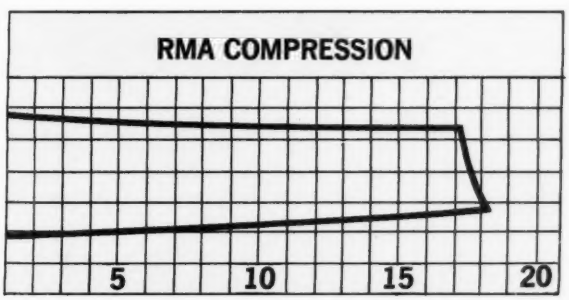
Hundreds of tests in Shell's Torrance laboratories during three years of research confirm its ease of handling in flat stock, standard cushions, and today's new pin core designs.

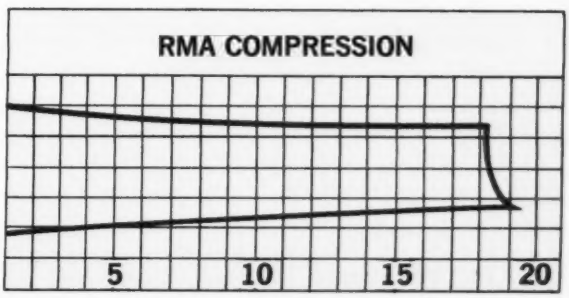
If you would like to try a test run of CL-104 in your own plant, contact your Shell representative. He'll help with all the details, and will show you how to start lowering your rubber latex foam costs.

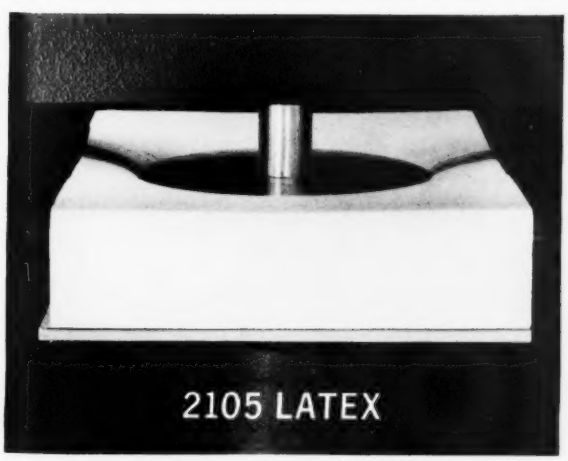


1. Photo above shows foam cushion made of standard 2105 latex. It weighs 480 grams. Photo below shows 2105 cushion registers RMA compression of 18 pounds at 25 per cent deflection.

2. Photo above shows same size cushion made of Shell CL-104. It weighs 405 grams—15 per cent less than the 2105 cushion. Photo below shows this lower density cushion has almost the same RMA compression.







SEE NEXT PAGE FOR PROPERTY CHART AND OTHER DATA ON SHELL CL-104 ⟶

TYPICAL FOAM PROPERTIES OF NEW SHELL CL-104

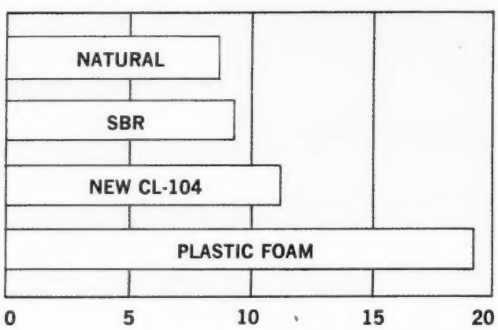
	CL-104	2105
Foam density, lb./cu. ft.	3.8	4.5
RMA compression, lb./50 in.²	18.0	17.5
Tensile Strength, psi	6.0	6.0
Elongation, %	170	200
Hot Wet Tensile Index, psi	3.2	3.0
Hot Wet Elongation, %	900	900
Compression Set, %	12.0	9.0
Volume Shrinkage	12.5	12.5
Flex Resistance, 250,000 cycles @ 77°F. Permanent Set, %	3.0	2.0
Change in RMA compression after flexing, %	−19	−15
Aging, 22 hours @ 212°F. Change in RMA compression, %	+15	+11

TEST FORMULA FOR SHELL CL-104

	PARTS DRY
CL-104	100.0
Sulfur	2.5
Zinc diethyldithiocarbamate	1.5
Zinc salt of 2-mercaptobenzothiazole	1.5
Antioxidant	1.0
Potassium oleate soap	1.0
Trimene Base*	0.75
Zinc oxide	3.5
Sodium silicofluoride	3.0

*Naugatuck Chemical Co.

COMPRESSION SET COMPARISON



Graph compares the compression set of Shell's CL-104 and three other foams after aging 22 hours at 158°F. The RMA maximum specification for foam cushioning is 20 per cent. Notice how CL-104 exhibits good compression set while giving higher compression resistance at a lower density.

How to get samples and technical data on new Shell CL-104

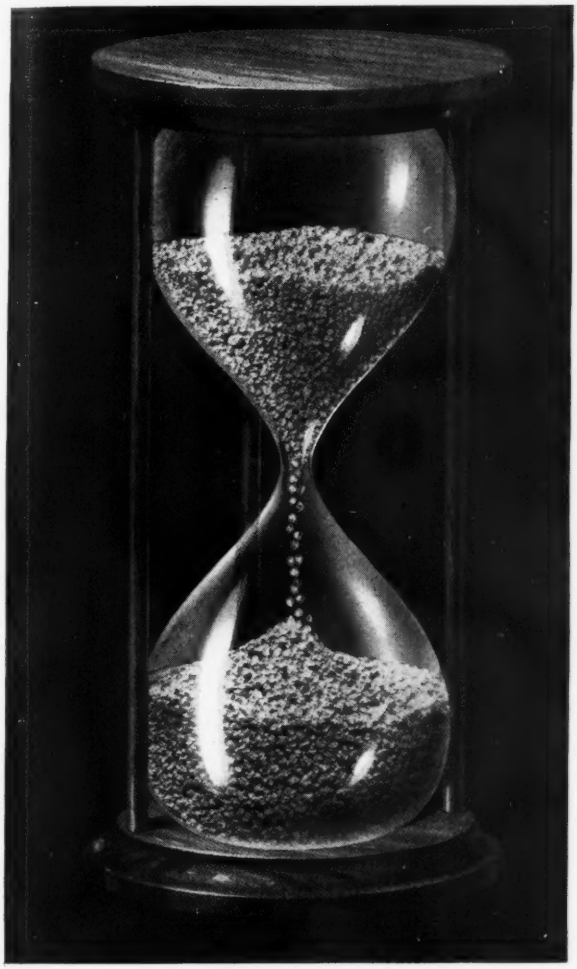
Samples of new CL-104 latex are now available for your evaluation. To receive samples and data, call your Shell Chemical representative, or write one of the three Shell Synthetic Rubber sales offices listed to the right.

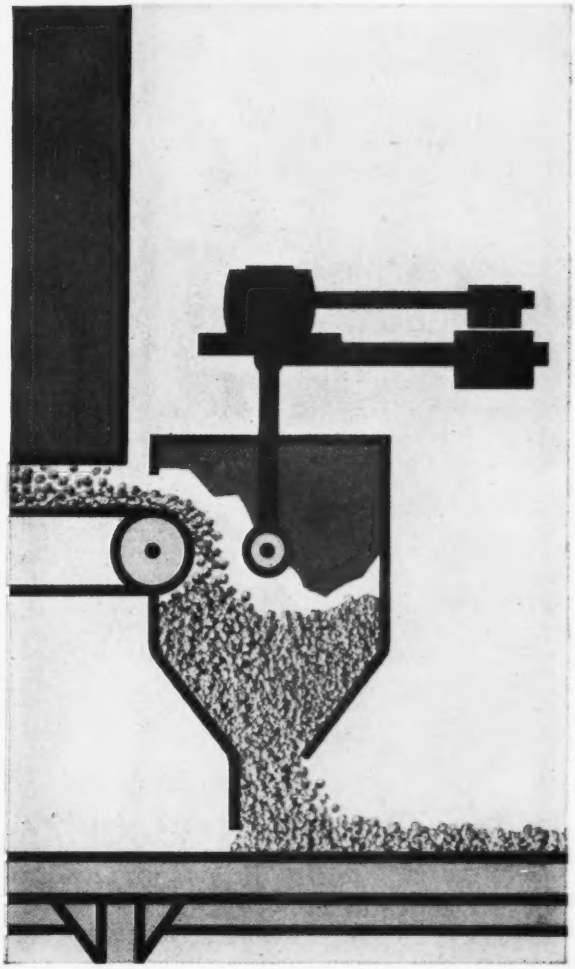
SHELL SYNTHETIC RUBBER

P. O. Box 216, Torrance, California

EASTERN	CENTRAL	WESTERN
500 Summer Street	20575 Center Ridge Road	5230 Clark Street
Stamford, Connecticut	Cleveland 16, Ohio	Lakewood, California
DAvis 5-1581	EDison 3-0600	SPruce 3-4997

Naugatuck DELAC-S PRILLS





New Free-Flowing, Non-Clogging **DELAC-S PRILLS** DESIGNED FOR AUTOMATION

Naugatuck DELAC®-S accelerator is now available in convenient new Prills . . . *small spherical particles about the size of buckshot.** New DELAC-S PRILLS, besides providing all the advantages of DELAC-S, offer important new processing features.

DELAC-S PRILLS:

- Are free-flowing, non-dusting . . . especially suited for automatic weighing and other automated equipment
- Are non-clogging, non-bridging . . . eliminate problems incurred with powdered accelerators
- Give fast cure at vulcanizing temperatures
- Allow fast, efficient processing without scorching or precure
- Are highly stable

For further information on how new DELAC-S PRILLS can increase your processing speed and efficiency, see your Naugatuck representative or write:

*Chemical dictionary definition

Naugatuck Chemical

Division of United States Rubber Company

1210R Elm Street
Naugatuck, Connecticut

Rubber Chemicals · Synthetic Rubber · Plastics · Agricultural Chemicals · Reclaimed Rubber · Latices · **CANADA:** Naugatuck Chemicals Division, Dominion Rubber Co., Ltd., Elmira, Ontario · **CABLE:** Rubexport, N.Y.

technical books

(*Continued from page 46*)

"Silicones for Potting and Encapsulating." General Electric Co., silicone products department, Waterford, N. Y. Technical Data Book S-23. 16 pages. The booklet contains information on the typical properties, use of, and storage and handling of RTV and LTV silicone compounds.

"Hotpack Humidity and Environmental Equipment." The Electric Hotpack Co., Inc., Philadelphia, Pa. 12 pages. This bulletin illustrates and includes specifications on the company's equipment from portable to walk-in chambers, covering a wide range of environmental conditions including modifications for automatic cycling and program control of temperatures.

"Conveyor Standardization." May-Fran Mfg. Co., Cleveland, O. 4 pages. MF Bulletin 200 B illustrates prefabricated conveyor sections for customized systems.

"Application of Mount Hope Expanders and Slack Selvage Eliminators to Coating Machine, Knife Type." No. 7. Mount Hope Machinery Co., Taunton, Mass. 2 pages.

"Good-rite and Hycar Polymers for Shoe Products." B. F. Goodrich Chemical Co., Cleveland 15, O. Manual HM-8. 40 pages. The manual contains information on the description, processing, and compounding of high styrene resins (Good-rite 2007 and 2057) and other Hycar materials applying to the shoe industry. Applications for floor tile, battery caps, cable jackets, and use with polystyrene are also given.

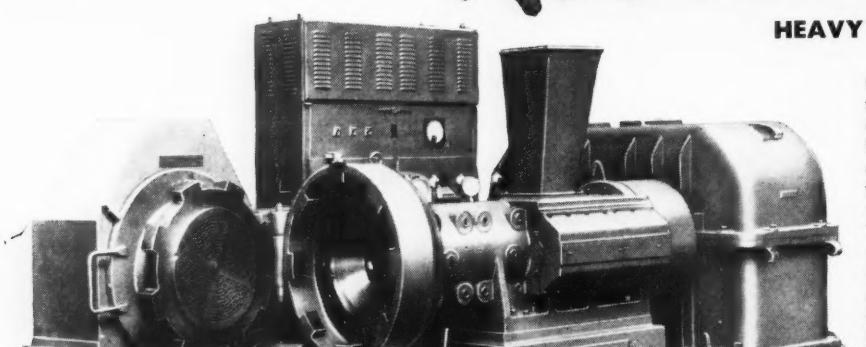
"CSC Methylamines." Commercial Solvents Corp., New York, N. Y. 64 pages. This is a comprehensive booklet containing a review of available technical data on the methylamines (mono-, di-, and tri-). There are full discussions on shipping, handling, storage and safety. Specification test methods are given in detail. Twenty-one pages are devoted to physical and thermodynamic properties. There are also sections on uses and chemical reactions.

"Diaphragms." Bellofram Corp., Burlington, Mass. 10 pages. No. 50A & 51A lists sizes and engineering data for 1,200 standard diaphragms in five classes.

"Cis-4 Polybutadiene in Wire Insulation Compounds for Low-Temperature Service." Phillips Chemical Co., Akron, O. 3 pages.

OPERATION "Reclaim"

HEAVY DUTY STRAINER



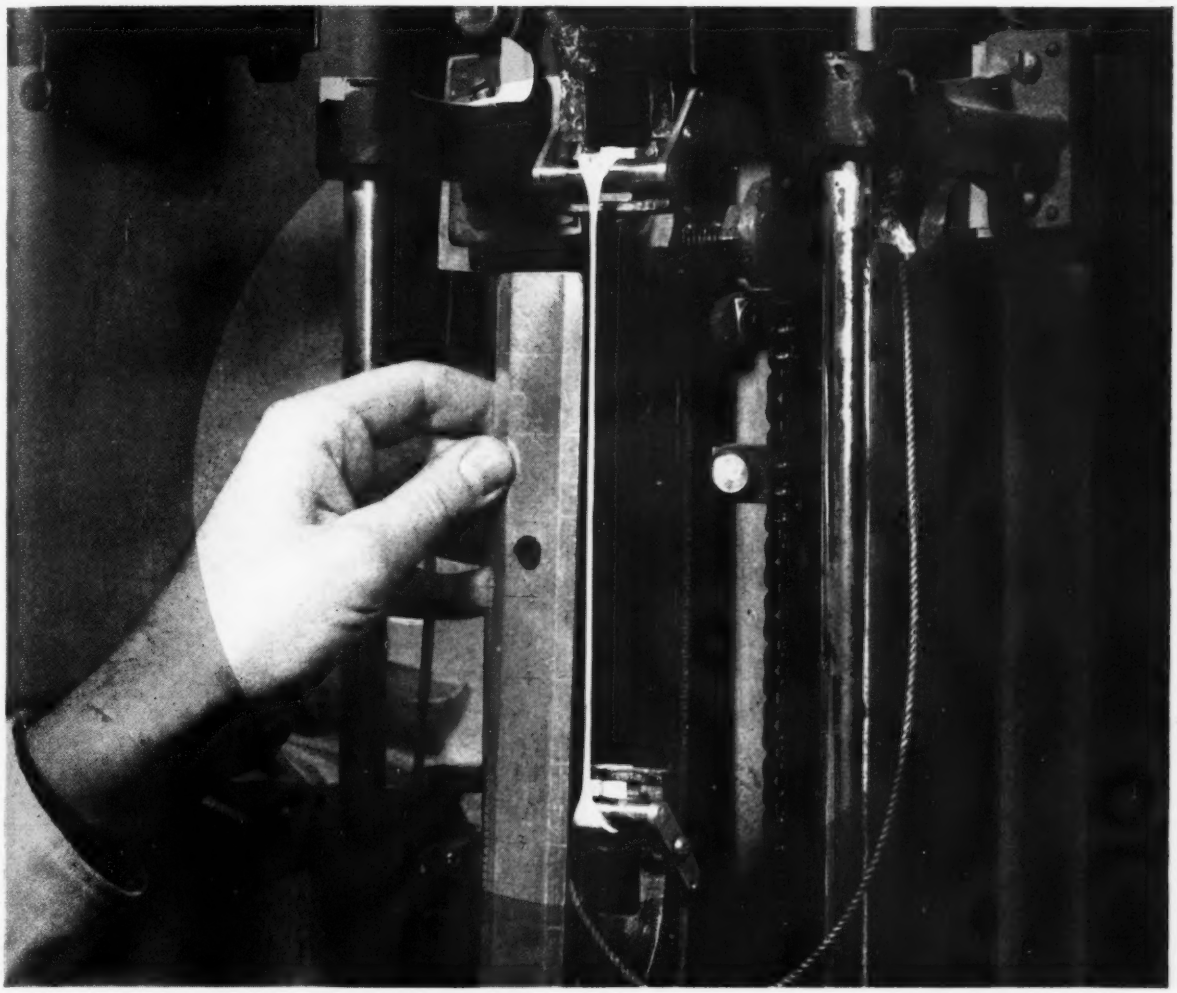
C.A. 10. Heavy duty straining machine, driven through double helical gear unit. Bayonet type locking head fitted with motor driven rotary cutter knife. The complete machine mounted on vibro-insulators, is an essential part of any plant devoted to the production of high quality reclaimed stock. Feed-roll type cylinder — quick-lock bayonet type head combined with interlocked fume hood guard and 10 inch diameter high production screw.

IDDON BROTHERS LIMITED

World-wide Representation — Manufacturers of Mixing Mills, Presses, Extruding Machines, Calenders and an extensive range of machines for rubber and plastics industries.

CONSULTATION SERVICE IN RELATION TO ALL RUBBER AND PLASTICS MACHINERY IS FREELY AVAILABLE

LEYLAND, LANCASHIRE, ENGLAND
Tel. LEYLAND 21258. Cables: Iddon, Leyland, Eng.
U.S. and Canadian Technical Sales and Service:
THE JOHN WILLIAMS MACHINERY LIMITED
1868 Mattawa Avenue, Cooksville, Ontario, Canada
Telephone: 279-7250



Improve heat resistance of latex compounds

with PENNSALT BUTYL ZIRAM

Latest studies in Pennsalt's continuing evaluation of latex accelerator systems show that high levels of Butyl Ziram can substantially improve heat aging resistance of Hevea films, SBR 2105 films and Hevea foam compounds, without appreciably increasing cure rate. The beneficial effects of Butyl Ziram can be enhanced by reducing the level of elemental sulfur and replacing the removed sulfur with Methyl Thiram.

The effects of variations in both Butyl Ziram and Methyl Thiram content were studied. In a typical Hevea foam compound, for example, the use of 2.0 PHR sulfur alone resulted in fast cure and appreciable thermal discoloration and softening after 32 hours aging, with extreme tackiness after 40 hours. Replacing 1.0 PHR sulfur with 1.0 PHR Methyl Thiram, and adding Butyl Ziram at levels of 0.75, 3.0 and 6.0 PHR resulted in no evident aging after 40 hours at 250°C, with progressively improved resistance to discoloration. Further addition of 1.0 PHR Methyl Thiram made delayed cures apparent. In each case, compounds containing 6.0 PHR Butyl Ziram discolored only slightly.

For your copy of the complete report, Bulletin S-180, ask your Pennsalt Representative or write Industrial Chemicals Division, PENNSALT CHEMICALS CORPORATION, Three Penn Center, Phila. 2, Pa.

Pennsalt Chemicals
ESTABLISHED 1850

SEE OUR COMPLETE LISTING IN CHEMICAL MATERIALS CATALOG

INDUSTRIAL CHEMICALS DIVISION

SALES OFFICES: AKRON • ATLANTA • CHICAGO • DETROIT • NEW YORK
PHILADELPHIA • PITTSBURGH • ST. LOUIS
H. M. ROYAL, INC., DOWNEY, CALIFORNIA

FOREIGN SALES: PENNSALT CHEMICALS OF CANADA LTD., OAKVILLE, ONTARIO
PENNSALT INTERNATIONAL, PHILADELPHIA, PA.
VONDELINGENPLAAT, ROTTERDAM, HOLLAND

technical books

Publications by Shell Chemical Co., Torrance, Calif., covering formulations using Shell Isoprene Rubber Type 305:

"Grade R 520 Black Compound." Bulletin SC 61-146. 1 page.

"Grade R 515 Non-Black Compound." Bulletin SC 61-147. 1 page.

"Grade R 615 Non-Black Compound." Bulletin SC 61-148. 1 page.

"The Pangborn Ventrijet." Bulletin No. 920. Pangborn Corp., Hagerstown, Md. 8 pages. The booklet explains the principle and operation of the equipment for wet dust control. It also includes plans and engineering data.

"Stanford Automatic Web Guides—110 Series for Intermediate Guiding." Stanford Engineering Co., Salem, Ill. 8 pages. This illustrated manual contains information on models available and applications of the series.

"Silicone Rubber for Wire & Cable Insulation." Technical Data Book S-4. General Electric, silicone products department, Waterford, N. Y. 8 pages.

Publications of Texas-U.S. Chemical Co., New York, N. Y.:

"Current Trends in Compounding Synpols for Tread Rubber." Bulletin No. 1, revised October, 1961. 14 pages. The bulletin contains a general discussion of the topic with representative formulas and properties.

"Synpols for Automotive Applications." Bulletin No. 6. 11 pages. Included are typical formulations of basic ASTM requirements, weatherstripping, brake cups, bumpers, and motor mounts. There are also two diagrams identifying auto body and chassis parts using SBR.

"Synpol 8209 (Intermediate Styrene) Oil-Extended Polymer." Bulletin No. 14. 11 pages. Covered are typical formulations and properties for floor tile, household goods, sheeting, soling, and battery cases.

"Diamond Chemicals for Industry." Diamond Alkali Co., New York, N. Y. 75 pages.

"Steel Rule Diemaking." Acme Steel Rule Die Corp., Waterbury, Conn.

"Viking Rigid Urethane Foaming Machine." Chase Chemical Corp., Pittsburgh, Pa. 1 page.

"'P-H' Series Hydraulic Web Guide Manual." Stanford Engineering Co., Salem, Ill. 8 pages.

With Eastman 910 Adhesive...

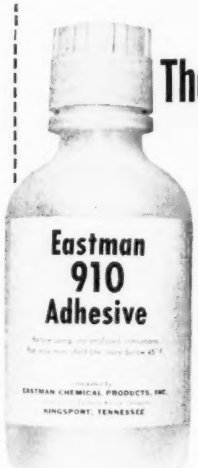
Tiny plastic components bonded in seconds!

There are over 150 components in Sonotone's new Model "66" hearing aid—yet the housing is no larger than a lump of sugar. In this example of miniaturization at its finest, Sonotone uses Eastman 910 Adhesive in more than a dozen fastening operations, joining parts made of plastic, rubber and metal. Many of the bonds are made by flowing the thin, clear adhesive into tiny spaces, and this is accomplished without stringing or balling.

Eastman 910 Adhesive will form bonds with almost any kind of material. *Skeptical?* Then send $5 for a trial kit and try it on *your* toughest job. Kits and further information are available from Armstrong Cork Co., Industrial Adhesives Div., Lancaster, Pa., or Eastman Chemical Products, Inc., subsidiary of Eastman Kodak Company, Kingsport, Tenn.

Here are some of the bonds that can be made with Eastman 910 Adhesive

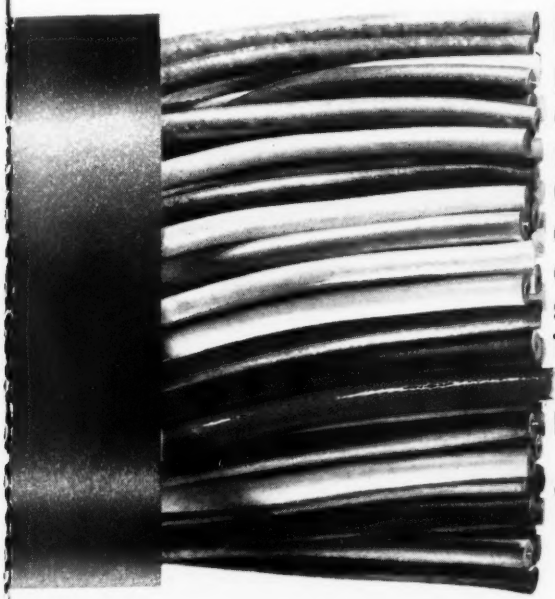
Among the stronger: *vinyls, phenolics, cellulosics, polyesters, polyurethanes, nylon; natural rubber, SBR, Buna N, most types of neoprene; most woods; steel, aluminum, brass, copper.* Among the weaker: *polystyrene, polyethylene,* and *fluoro-hydrocarbon plastics* (shear strengths up to 150 lbs./sq. in.).



There is no adhesive like Eastman 910 Adhesive

SETS FAST—Makes firm bonds in seconds to minutes.
VERSATILE—Joins virtually any combination of materials.
HIGH STRENGTH—Up to 5,000 lbs./sq. in. depending on the materials.
READY TO USE—No catalyst or mixing necessary.
CURES AT ROOM TEMPERATURE—No heat required to initiate or accelerate setting.
CONTACT PRESSURE SUFFICIENT.
LOW SHRINKAGE—Virtually no shrinkage on setting as neither solvent nor heat is used.
GOES FAR—One-pound package contains about 14,000 one-drop applications.
The use of Eastman 910 Adhesive is **not** suggested at temperatures above 175°F., or in the presence of extreme moisture for prolonged periods.

See Sweet's 1961 Product Design File 10d/Ea.



MAKE COLORS BEHAVE! Start with pigments in more colors than you would probably ever need. Add creative and technical talent to make them behave most profitably. That's how Collway helps you most. For instance: in polyethylene, vinyl and rubber insulation, Collway pigments combine dielectric stability and high tinctorial strength with lasting resistance to heat and light. The result is superior performance plus economy. Want a fresh slant on color? Collway can help. For samples, technical service or counsel: Dept. 128

FROM RESEARCH TO REALITY

COLLWAY gaf

COLLWAY PIGMENTS

A DIVISION OF

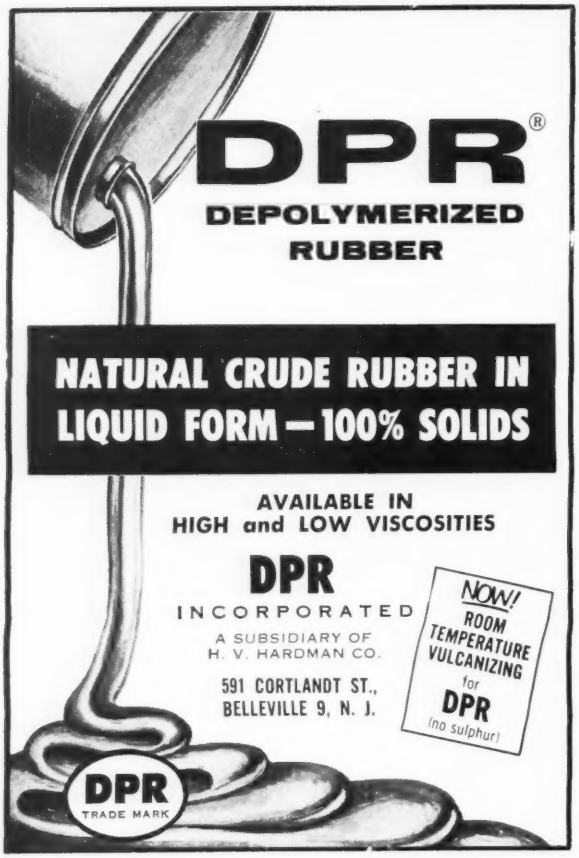
GENERAL ANILINE & FILM CORPORATION

435 HUDSON STREET · NEW YORK 14, NEW YORK

CHARLOTTE • CHATTANOOGA • CHICAGO • LOS ANGELES • NEW YORK • PHILADELPHIA • PORTLAND, ORE. PROVIDENCE • SAN FRANCISCO • IN CANADA: CHEMICAL DEVELOPMENTS OF CANADA, LTD., MONTREAL

troved Pigments For Insulation Use / Heliogen® Green / Heliogen® Blue / Pyrazolone Red / Permagen® Red / Permanent Violet / Permagen® Yellow

gen, Permanent and Permagen pigments manufactured by General Aniline & Film Corp. are sold outside the United States and Canada under the trade name "Fenalac" by distributurs all over the world.



EAGLE-PICHER

...an important source of lead and zinc compounds for the rubber industry

Eagle-Picher offers you a comprehensive line of both lead and zinc compounds, produced with highest quality control standards to your exact specifications.

Our customer service and research staffs are geared to answer your special needs . . . with courteous dispatch and resourcefulness.

Zinc Oxides
Basic White Lead Silicate
Basic Carborate of White Lead
Sublimed White Lead
Litharge
Sublimed Litharge
Red Lead (95%-97%-98%)
Sublimed Blue Lead
Lead Peroxide

EAGLE EP PICHER

Since 1843

The Eagle-Picher Company
Department RW-1261
Cincinnati 1, Ohio

new products

■

Wire Reinforced Tire

The Goodyear Tire & Rubber Co., Akron, O., has announced the production of larger sizes of off-the-road tires with wire reinforcement. Literally millions of pieces of shredded wire, 0.0058-inch in diameter, are processed and calendered into thin sheets which are then laminated to form the undertread.

The company claims that this barrier of steel greatly increases cut resistance, thus resulting in longer tire life with reduced replacement and maintenance expense for heavy-equipment operators.

Magnetic Rubber

Flexible magnetic rubber for finished industrial products is now being manufactured by Regal & Wade Mfg., Inc., Maspeth, N. Y. The product offers permanent magnetism and is available in many forms; strips up to three inches wide, lengths up to 60 inches, precut specific shapes or custom decorated, and thicknesses from 0.030- to 0.250-inch. The magnetic attraction is proportionate to the thickness. This rubber will adhere to any ferrous surface, and by applying a self-stick adhesive it can be attached to any non-ferrous surface and still offer one magnetic surface.

Primary applications are as note or small object holders, bulletin or point-of-purchase displays, and spot advertising reminders. Finished art work or glossy photographs are all that is required to use the material for unusual business cards and replicas of company trade marks, symbols, and products. The smooth surface may be painted, silk screened, gold stamped, carved, or covered with a variety of materials.

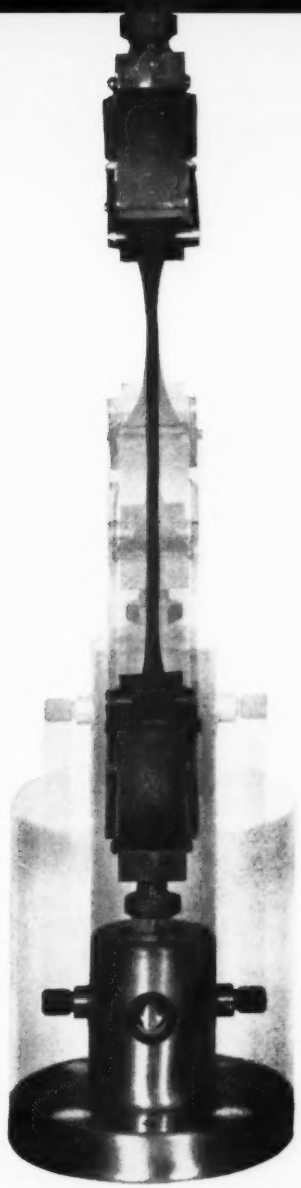
Rubber Sealers

Minnesota Mining & Mfg. Co., St. Paul, Minn., has introduced two rubber-base joint sealers with a twin bead design.

Exterior and interior joints between curtain wall panels and glass and the metal framework of buildings can be sealed.

The sealers are recommended for sealing interior or exterior joints and openings between curtain wall

(Continued on page 58)



Rubber has more stretch when it's formulated with Neville C-I® Resin

Test after test on the Instron has clearly shown the superiority of quality rubber formulations using Neville Coumarone-Indene Resins in place of competing products. Compounds with Neville C-I Resin repeatedly showed better elongation and tensile strength characteristics both before and after aging.

But stretch and strength are not the only advantages gained through the use of these resins. Their unique ability to impart plasticity brings many processing benefits. Mixing, milling, calendering and tubing will be faster and smoother, and cures will be more uniform. You'll obtain improved mold flow, better knitting and a thinner flash line. Also, these resins are economically priced and will effectively lower pound volume cost in highly loaded stocks while still retaining good physicals. They are available in flaked, solid or liquid form and in a wide range of colors from ½ to 16 Neville. Softening points are from 10°C. to 155°C. Write for further information.

Neville Chemical Company, Pittsburgh 25, Pa.

NEVILLE®

Neville Products

Resins—Coumarone-Indene, Hydrocarbon (Thermoplastic and Heat Reactive), Hydroxy • **Oils**—Plasticizing, Neutral, Rubber Reclaiming, Shingle Stain • **Solvents**—Aromatic (Refined and Crude), Semi-Aromatic (Refined and Crude). • **Antioxidants**—Non Staining Rubber • **High Purity Indene • Indene Derivatives • Crude Naphthalene.**

Use **CLAREMONT** *Cotton* **FLOCKS**

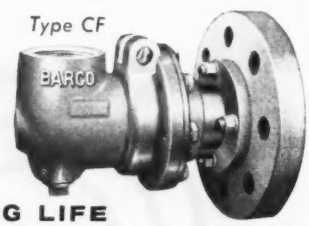
Claremont has served the rubber industry for over thirty years as a supplier of quality flocks produced to fit specific requirements. Whether used inside or outside, as a filler or as a finish, the superiority of Claremont Cotton Flocks is recognized by all users.

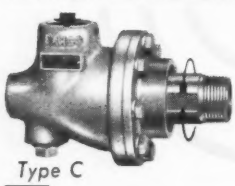
Used as a compounding agent in the manufacture of mechanical rubber goods and general sundries, Claremont Flock Fillers provide reinforcement, improve tear and abrasion resistance. Claremont flock finishes for rubber fabrics provide a wide range of appealing textures that are uniform and long-wearing. In many applications the proper use of a Claremont flock will substantially reduce production costs.

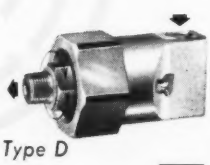
Claremont's knowledge of the industry's needs and its capacity for large production and quick delivery have made it the country's foremost producer of cotton flocks. Samples will be furnished upon request for laboratory and test runs. Inquiries invited!

CLAREMONT FLOCK CORPORATION
CLAREMONT, NEW HAMPSHIRE
The Country's Largest Manufacturer of Flock

Check with **BARCO** **for LONG LIFE**
ROTARY JOINTS




Type C


Type D

BARCO is HEADQUARTERS for Rotary Joints!
Types . . . Sizes . . . Styles for every purpose:

Type C—Top performer in industry for dryers, dry cans, rolls, and drums. Threaded ends, ½" to 3". Syphon or single flow. Steam, water, oil, air, gas, or chemicals. Also Type CR for rotating syphon.

Type CF—Flanged end connection for easy installation. 1½", 2", 2½", 3". 200-225 psi.

Series 300—Large size, up to 2½" x 2½", 300 psi joints for circulating liquids. To 600° F.

Type CC—New heavy duty rotary joint for handling shock loads on calender rolls.

Types D - E—High speed, ball bearing ¼" rotary joints for hydraulic fluids, coolants, and compressed air on spindles, drills, and clutches.

Write *Send for latest catalogs.* **BARCO MANUFACTURING CO.**
510N Hough Street • Barrington, Illinois

new products

(Continued from page 56)

panels and glass and the metal framework of buildings. These sealers, moreover, permit sealing of uneven or tapered joints and 90-degree bending without fitting operations. Adhesive properties of the sealers enable them to remain in place, even vertically, until a mating surface can be assembled.

The sealers reportedly have outstanding resistance to ozone, weathering, and industrial atmospheres and remain flexible and strong for many years.

3M Brand Twin Bead Sealer Type H (hollow) can be compressed to one half its original dimensions and is useful in uneven seams. Type S (solid) can be compressed to one-third its original dimensions and has better void filling characteristics for wide seams.

Liquid Adhesive Tape

Shamrock Liquid Adhesive Tape can be extruded, flowed, or roller coated on almost any surface and, when dry, acts in the same manner as a pressure-sensitive tape. The strength of the bond is in direct proportion to the amount applied. The material, made by Rubba, Inc., New York, N. Y., is recommended for making self-adhering signs, self-sticking floor, wall, and acoustical ceiling tiles, and other industrial applications.

Foam-to-Fabric Adhesive

Excellent adhesion after washing and dry cleaning is reported with the use of Tylac Latex CD-1-80-1 in combining flexible polyurethane (polyether and polyester types) foam to fabric. International Latex Corp., Dover, Del., offers the material which can be applied by using a spreader bar, roller or spray method.

Three to five minutes at 300-325° F. in a high-velocity forced air oven produce a satisfactory cure. In addition to the excellent adhesion, laboratory results show soft hand, good drape, and good color and compound stability.

Low Friction Seal

Seals East Orange, Inc., East Orange, N. J., manufacturer and distributor of O-rings, V-rings, U-cups, mechanical packings, and molded rubber specialties, has made available its new low-friction Teflon coated seals, for use in dynamic applications where breakout and running friction are problems. The outer seal wall is coated with an even dispersion of Teflon, reducing the coefficient of friction to between 0.05 and 0.07 and, according to the manufacturer, reducing breakout and running friction and increasing the life and the durability of the seal.

Stop looking for spring wire in large coils...it's here (*courtesy of Roebling*)

This is really an enormous availability—3000 pounds of high carbon spring wire in a single, nonstop coil. You know what this means. Uninterrupted productivity. You make more of your products faster and, as with *any* length of Roebling spring wire, you make them better.

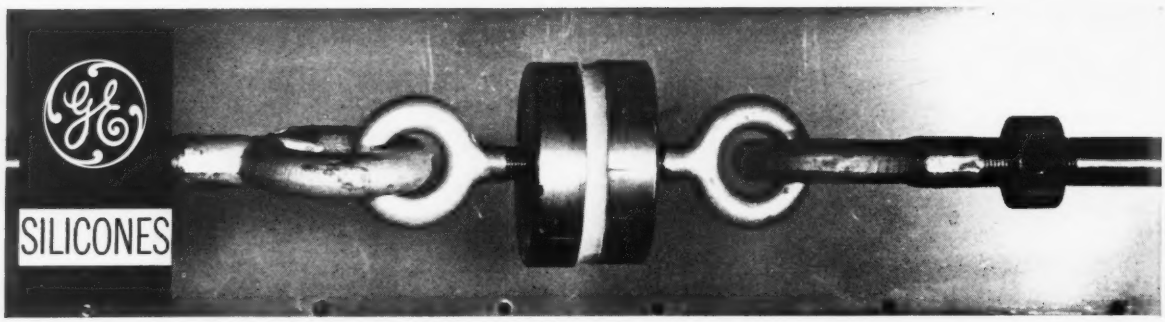
Another happy availability (also in large coils) is new Roebling Springkote* Wire. Springkote runs through feed rolls without slippage, stress relieves more uniformly and takes finishes better—yet costs no more than lime-coated wire.

For information on this ready abundance and on new Roebling Springkote, write Roebling's Wire and Cold Rolled Steel Products Division, Trenton 2, N. J.

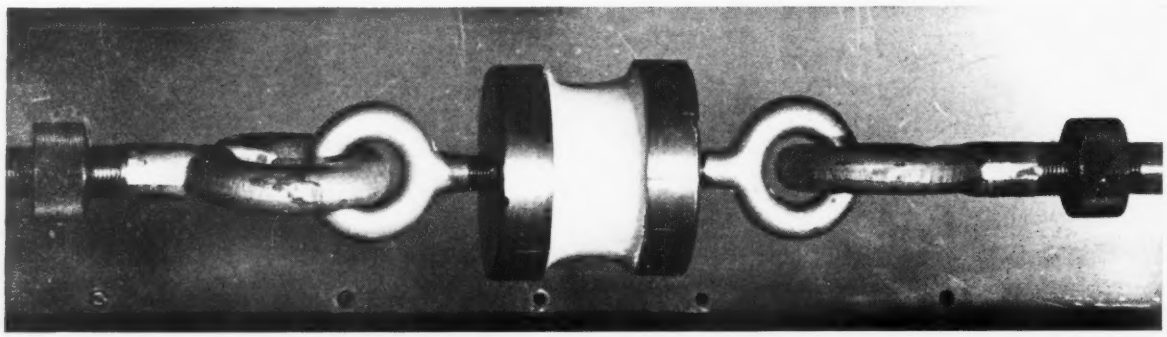
*Reg. applied for

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation



New General Electric silicone rubber bonds



to many metals without a primer - the bond is stronger than the rubber!

Here is the final proof of the bonding strength of General Electric's new self-bonding rubber. This high strength rubber was pulled apart at over 1500 psi, but the bond remains intact. The rubber never parted from the steel.

Cuts out half the steps in bonding process

Shown above is General Electric's new high strength self-bonding rubber in action: Without using a primer you can bond this rubber to steel and many other metals so well that the bond is stronger than the rubber itself! SE5504 is one of the strongest silicone rubbers available.

With new SE5504, you can now cut your bonding process in half, by eliminating these four steps: Grinding or sandblasting metal; detergent washing; primer application; oven cure for primer.

Now, you just: Wash metal with solvent; apply self-bonding SE5504; oven cure the rubber. That's all.

This new rubber virtually eliminates rejects due to poor bonding. You speed up production, increase profits, and provide a better product for your customers.

For all the details on new self-bonding SE5504, along with application data, write: General Electric Company, Silicone Products Dept., Section H1245, Waterford, New York.

Progress Is Our Most Important Product

GENERAL ELECTRIC

Protox zinc oxides cut mixing costs and increase Banbury output through rapid dispersion in all types of elastomers. The above masterbatches of 70 parts of oxide and 30 of rubber were mixed for three minutes in a "00" laboratory Banbury. Protox-169 (top) is completely dispersed, but untreated zinc oxide (bottom) requires further mixing to disperse the aggregates.

Are You Taking Advantage of the MOST EFFECTIVE Surface Treatment to *Improve Dispersion* of Zinc Oxide in Rubber?

PROTOX®
Zinc Oxides

Protox zinc oxides are designed to help you cut processing costs. They provide fast and complete dispersion in your compounds to shorten mixing time. The key is the unique coating of zinc propionate on Protox particles.

Protox zinc oxides have no hard-to-disperse aggregates because the coated particles are insulated one from the other. They are dispersed readily in any rubber under any weather conditions.

And don't forget — Protox zinc oxides are part of the HORSE HEAD line of pigments. That makes these American-made zinc oxides the most dependable you can buy.

HORSE HEAD PRODUCTS ®

THE NEW JERSEY ZINC COMPANY 160 Front Street, New York 38, N. Y.

Founded 1848

Also Distributed by

VAN WATERS AND ROGERS SEATTLE · PORTLAND (ORE.) · SPOKANE · VANCOUVER, B. C. · DALLAS · HOUSTON

ST. LAWRENCE CHEMICAL COMPANY, LTD. TORONTO, ONT. · MONTREAL, QUE.

ATLANTA · BOSTON
CHICAGO · CLEVELAND
LOS ANGELES

PHILPRENE
MADE IN U.S.A.
PHILLIPS CHEMICAL COMPANY
BARTLESVILLE, OKLAHOMA

How Philprene* helps you to be Santa (to your customers) all year 'round

Christmas comes but once a year—but you can play Santa throughout 1962—by supplying your customers products made of Philprene rubber polymers. You'll find your role profitable, too . . . because easy-processing Philprene polymers give you lower cost compounds and improved plant operation. You get prompt delivery . . . and the valuable technical services offered by your Phillips representative.

*A trademark

Philprene PHILLIPS 66

PHILLIPS CHEMICAL COMPANY, Rubber Chemical Sales Division, 318 Water St., Akron 8, Ohio; **Sales Offices:** Akron, Chicago, Dallas, Providence and Trenton; **West Coast:** Harwick Standard Chemical Company, Los Angeles, California; **Export Sales:** Phillips Petroleum International Corporation, Sumatrastrasse 27, Zurich 6, Switzerland; Distributors of Phillips Chemical Company Products, 80 Broadway, N. Y. 5, N. Y.

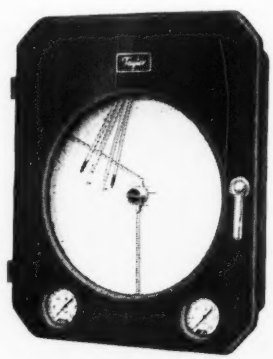
BETTER PRESS CONTROL

...WITH VALVES, TIMERS AND TEMPERATURE CONTROLS BY TAYLOR!

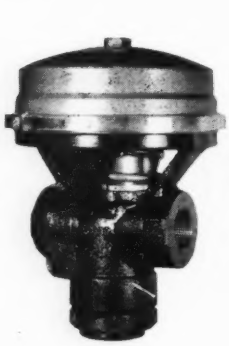
Now Taylor can supply you with all your requirements for automatic press control. And you benefit not only from top quality, dependable instrumentation, but from Taylor's years of experience in serving the rubber industry. Ask your Taylor Field Engineer or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Ontario.

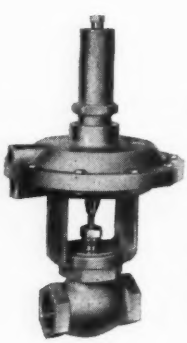
New FLEX-O-TIMER® Timed Program Controller (No. 350 RJ series) accurately handles up to 12 pneumatic and or electric functions with extremely short time intervals between steps . . . $7\frac{1}{2}$ seconds on 30-min. cycle dial, minimum on other dials in same ratio. Cycle range quickly adjusts for 15 to 60 minutes for high speed range—1 to 16 hours for low speed range. Time dial resets to zero in maximum of 13 seconds at completion of cycle. Ideal for completely automatic timing of tire or platen presses. Write for **Bulletin 98373.**

FULSCOPE® Temperature Controller, No. 251R Limited Range Sensitivity (30-300) has been the standard of dependability for over 20 years. Many have been in service that long with practically no major service required. Sturdy, highly adaptable, easy to understand and service. **Bulletin 98291.**



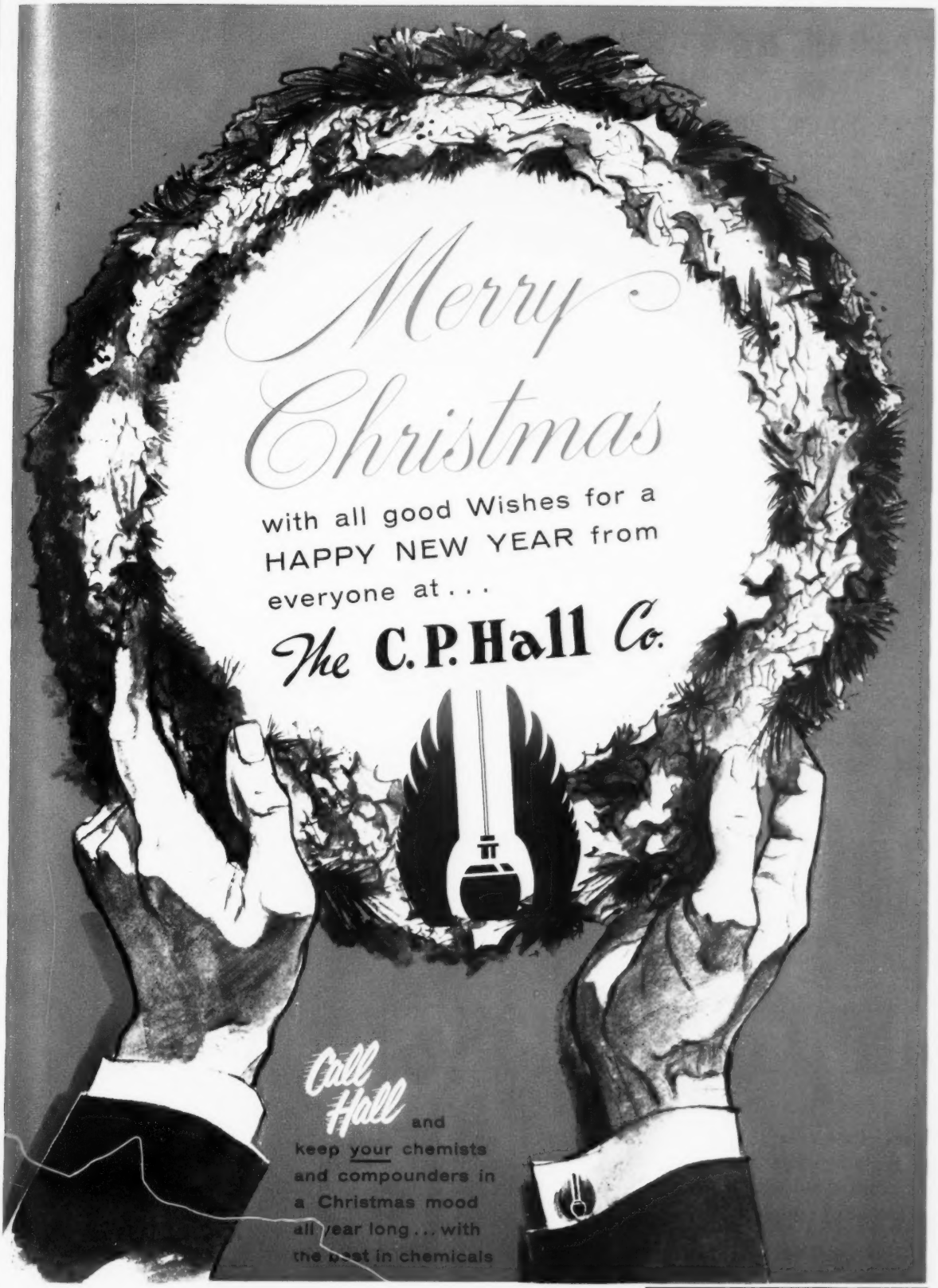
New No. 1078V Series Valve. A small, compact piston-actuated valve, design for Hot and Cold Service up to 500 psi and 400 F. Ductile iron body and spider give added strength, low coefficient of expansion. Sizes 1" through $1\frac{1}{2}$". Half the number of parts of a diaphragm operated valve, and exceptionally simple design insure long, trouble-free service. **Bulletin 98419.**





New Taylor 1000V Series Valve features exclusive reversible actuators for "air-to-open" or "air-to-close" service. Suitable for hot and cold service to 200 psi; cold service only up to 400 psi. Bronze body with choice of Monel seat and disc, or stainless bevel plug and seat of exceptional hardness. Sizes range from $\frac{1}{4}$" to 3". Ideal, low-cost pneumatic control for "on-off" service. **Bulletin 98417.**

Taylor Instruments **MEAN ACCURACY FIRST**


Merry Christmas
with all good Wishes for a HAPPY NEW YEAR from everyone at...
The C.P. Hall Co.
Call Hall and keep your chemists and compounders in a Christmas mood all year long... with the best in chemicals

AKRON	CHICAGO	MEMPHIS	LOS ANGELES	TORRANCE, CALIF.	NEWARK
Phone	Phone	Phone	Phone	Phone	Phone
JEfferson	POrtsmouth	JAckson	SPruce	FAirfax	Mitchell
5-5175	7-4600	5-8253	5-6666	0-2211	3-2614

The C.P. Hall Co.
CHEMICAL MANUFACTURERS

this is a job for Wheelabrator® impact deflashing

Many skilled hands couldn't strip the flash from these rubber O-Rings one hundredth as fast or as cleanly as the new Wheelabrator method. Impact deflashing of molded rubber parts, pioneered and perfected by Wheelabrator, removes flash accurately and uniformly from thousands of parts like these in just 3 to 5 minutes time.

Thoroughly tested in laboratory and field use, Wheelabrator deflashing has become the basis of major cost reduction for many prominent rubber parts manufacturers. Trimming time is saved. Trimming costs are cut. Absolute uniformity of parts is assured, with rejects virtually eliminated.

Wheelabrator offers you unmatched experience with impact deflashing, assuring you a successful, cost-cutting solution to your rubber deflashing problems.

NO PART TOO LARGE, TOO SMALL, TOO COMPLEX

The Wheelabrator process is highly versatile. Molded rubber parts from minute sizes not much larger than a pin head to large O-rings are deflashed with equal speed and ease. Plain round seals and intricately-shaped gaskets, parts with metal or plastic inserts are being deflashed to perfection, without altering part dimensions or damage to finish. Only the frozen flash is removed.

Benefits like these from Wheelabrator impact deflashing are now being enjoyed by leading rubber firms:

"Flash removal is so dependable we use the Wheelabrator as a quality control measure for checking conditions of mold cavities."

"The Wheelabrator has enabled us to call on new prospects for business we couldn't handle before."

"Average time from molding to shipping used to be 2 to 3 weeks. Now it's 3 or 4 days."

"We've virtually eliminated customer rejections of O-rings due to flat spots caused by buffing."

ORIGINATED, PERFECTED AND PATENTED (No. 2,996,846) by Wheelabrator Corporation

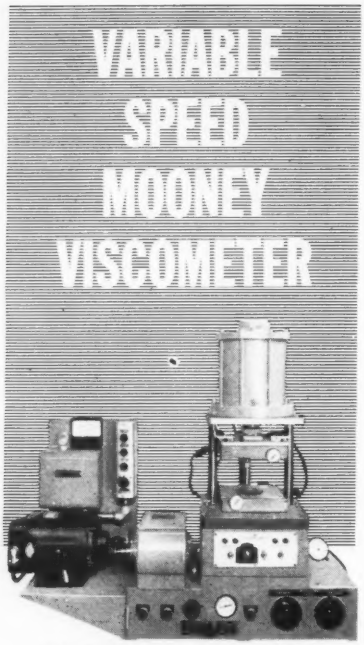
The Wheelabrator Impact Deflasher provides the rubber industry with a perfected tool for drastically reducing costs and for producing a much higher quality product. It is the revolutionary result of more than three years of intensive research and cooperative development with the rubber industry. And it is Performance-Proved in day-to-day production in the plants of some of the most prominent rubber parts manufacturers, of which the following is a partial list:

Parker Seal Company
Victor Manufacturing & Gasket Co.
Lebanon Manufacturing Company
Chicago Rawhide Manufacturing Co.
Goshen Rubber Company, Inc.
Minnesota Rubber Company
Vernay Laboratories, Inc.
Houghton Vix-Syn Company
Acadia Synthetic Products Div. of Western Felt Works
Plastic & Rubber Products Company
Western Rubber Company
Roth Rubber Company
International Packing Company
Michigan Precision Molded, Inc.
Illinois Milling, Inc.

VITAL VALUES FOR INDUSTRY

WHEELABRATOR
Rubber Deflashing

For a laboratory demonstration of impact deflashing on your own parts, write to WHEELABRATOR CORP., 644 S. Byrkit St., Mishawaka, Ind. In Canada, WHEELABRATOR CORP. OF CANADA, LTD., PO Box 490, Scarborough, Ont.



PROVIDES A RANGE OF SHEARING RATES

Scott Model STI Mooney Viscometer is now available with a variable speed drive unit to permit measurement of viscosity at different rates of shear . . . to provide required test data for control in the manufacture and use of plastic and high molecular weight elastomers, in conformance with ASTM Designation D1646 (formerly D927 and D1077), ISO, Governmental and industry standards.

New Variable Speed Drive offers shear rates from .05 to 20 RPM without stopping the test . . . and includes a tachometer for convenience in rate setting. This unit is a modification of the world-standard Scott Model STI Mooney Viscometer, known and accepted as a must for economical operation and the production of high quality products.

Precise Temperature Control within ±½ °F at any set temperature to 400°F is another important feature of the Scott Model STI. Designed and constructed for fast, easy calibration, effortless operation, and a modicum of maintenance . . . the new Variable Speed Viscometer may also employ Scott's new *dual-pen* recorder which simultaneously records viscosity in Mooney units and temperature of test specimen in °F, on *one* chart.

Write today for full details on the Variable Speed Model STI. Scott Testers, Inc., 90 Blackstone St., Providence, Rhode Island. Tel.: DExter 1-5650 (Area Code 401).

SCOTT TESTERS

THE SURE TEST . . . SCOTT

CALENDAR of COMING EVENTS

January 16
Elastomer & Plastics Group, Northeastern Section, ACS.

January 18
Quebec Rubber & Plastics Group. Panel Discussion on Polyurethanes.

January 26
Akron Rubber Group. Sheraton Hotel, Akron, O.
Chicago Rubber Group. Furniture Club, Chicago, Ill.
Philadelphia Rubber Group. Poor Richard Club, Philadelphia, Pa.

January 26-27
Southern Rubber Group. Shamrock-Hilton Hotel, Houston, Tex.

February 5-9
American Society for Testing Materials. Committee Week. Statler Hilton Hotel, Dallas, Tex.

February 6
The Los Angeles Rubber Group, Inc.

February 8
Fort Wayne Rubber & Plastics Group. Van Orman Hotel, Fort Wayne, Ind.

February 20
Elastomer & Plastics Group, Northeastern Section, ACS.

February 23
Quebec Rubber & Plastics Group. Ladies Night.
Akron Rubber Group. Dance. Sheraton Hotel, Akron, O.

March 2-4
Boston Rubber Group. Ski Week-End. Bartlett Hotel, Bartlett, N. H.

March 6
The Los Angeles Rubber Group, Inc.

March 16
Boston Rubber Group. Somerset Hotel, Boston, Mass.
Chicago Rubber Group. Furniture Club, Chicago, Ill.

March 20
Elastomer & Plastics Group, Northeastern Section, ACS.

March 20-29
American Chemical Society. Washington, D. C.

March 22
Quebec Rubber & Plastics Group. Technical Meeting—Aging of Rubber.

March 23
New York Rubber Group. Henry Hudson Hotel, New York, N. Y.

March 24-27
National Association of Secondary Material Industries. Forty-Ninth Annual Convention. Edgewater Beach Hotel, Chicago, Ill.

April 3
The Los Angeles Rubber Group, Inc.

April 5
Fort Wayne Rubber & Plastics Group. Van Orman Hotel, Fort Wayne, Ind.
Akron Rubber Group. Sheraton Hotel, Akron, O.
Rhode Island Rubber Club. Pawtucket Country Club, Pawtucket, R. I.

April 17
Elastomer & Plastics Group, Northeastern Section, ACS.

April 19
Quebec Rubber & Plastics Group. Technical Meeting—Butyl Tires.

April 24-27
Division of Rubber Chemistry, ACS. Statler Hotel, Boston, Mass.

May 4
Rubber Chemistry Division, Chemical Institute of Canada. Niagara Falls, Ont., Canada.
Chicago Rubber Group. Furniture Club, Chicago, Ill.
Philadelphia Rubber Group. Poor Richard Club, Philadelphia, Pa.

May 14-18
International Rubber Conference. Paris, France.

May 15
Elastomer & Plastics Group, Northeastern Section, ACS. Annual Short Talks Symposium.

May 19-29
Europlastique 1962. Paris, France.

June 1
Quebec Rubber & Plastics Group. Golf Outing.

June 7
New York Rubber Group. Outing.
Rhode Island Rubber Club. Outing. Pawtucket Country Club, Pawtucket, R.I.

June 8
Fort Wayne Rubber & Plastics Group. Golf Outing. Tippecanoe Country Club, Leesburgh, Ind.

June 8-9
Southern Rubber Group. Dinkler-Tutwiler Hotel, Birmingham, Ala.

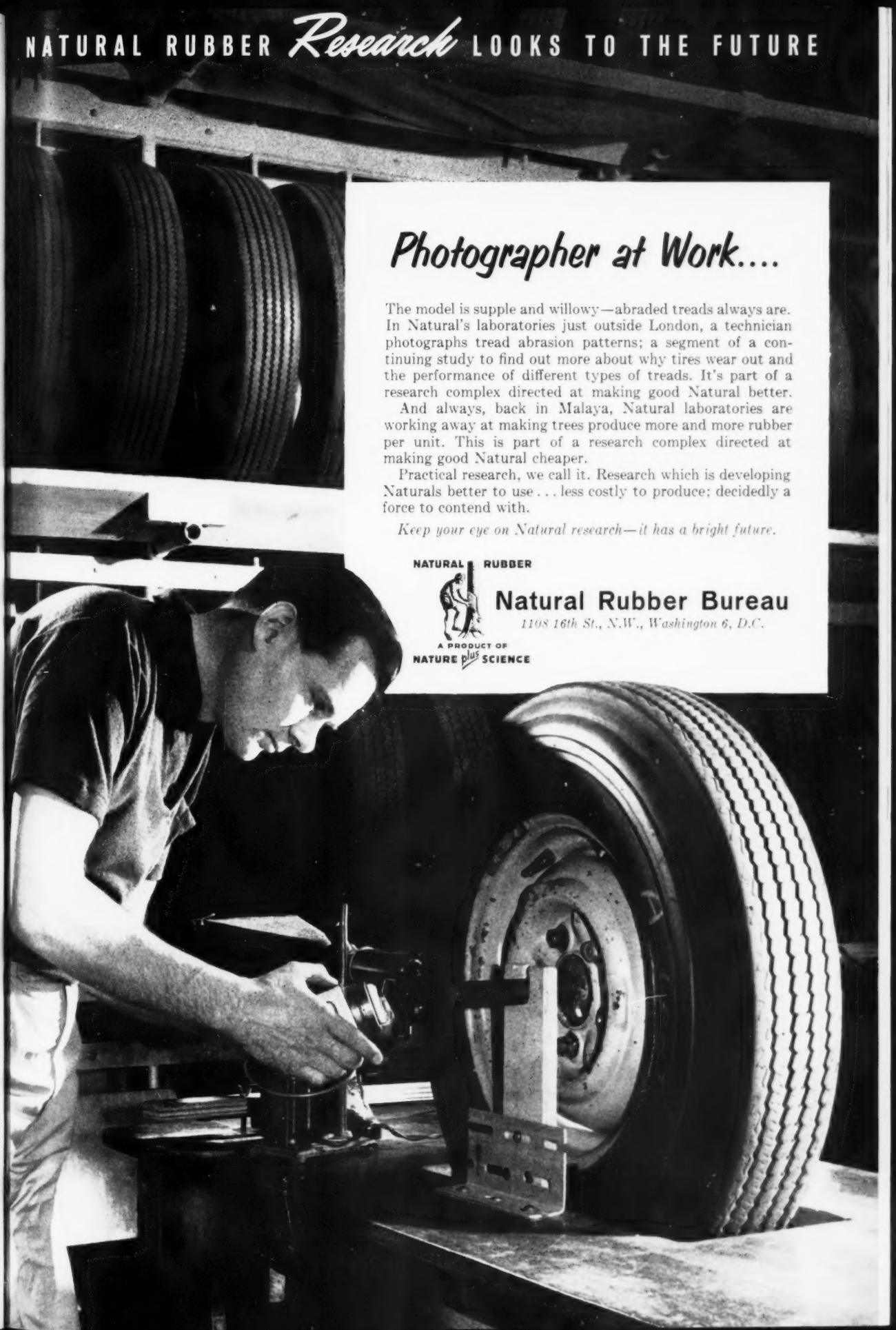
June 15
Boston Rubber Group. Summer Outing. Andover Country Club.

June 22
Akron Rubber Group. Outing. Firestone Country Club, Akron, O.

June 24-29.
ASTM. Annual Meeting and Apparatus Exhibit. Statler Hotel, New York, N. Y.

August 17
Philadelphia Rubber Group. Annual Outing. Manufacturers Country Club, Oreland, Pa.

NATURAL RUBBER *Research* LOOKS TO THE FUTURE



Photographer at Work....

The model is supple and willowy—abraded treads always are. In Natural's laboratories just outside London, a technician photographs tread abrasion patterns; a segment of a continuing study to find out more about why tires wear out and the performance of different types of treads. It's part of a research complex directed at making good Natural better.

And always, back in Malaya, Natural laboratories are working away at making trees produce more and more rubber per unit. This is part of a research complex directed at making good Natural cheaper.

Practical research, we call it. Research which is developing Naturals better to use . . . less costly to produce; decidedly a force to contend with.

Keep your eye on Natural research—it has a bright future.

NATURAL RUBBER

A PRODUCT OF NATURE plus SCIENCE

Natural Rubber Bureau

1108 16th St., N.W., Washington 6, D.C.

HUBER

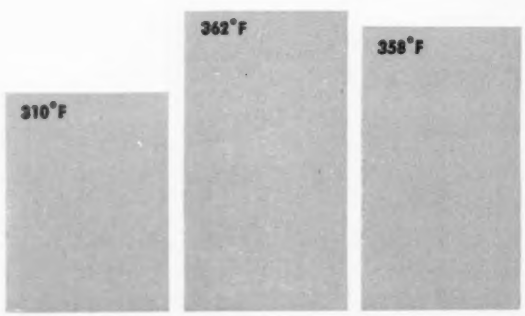
ZEOLEX 23

The unique, ultra-fine, white reinforcing pigment!

Generates less heat during mixing – gives excellent dispersion

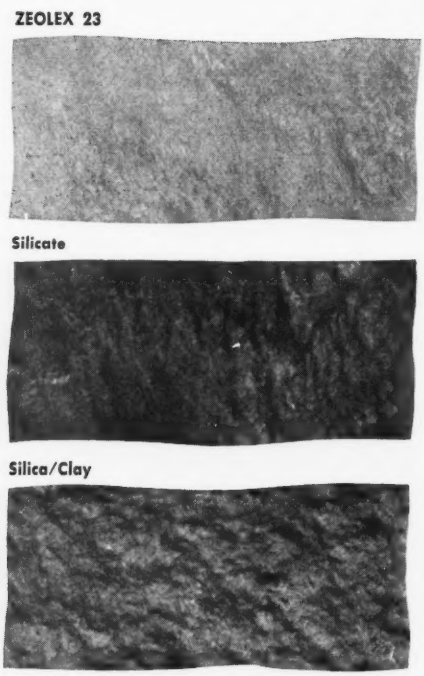
Lower plasticity – smoother raw stocks!

Heat generation during mixing



60 p.h.r.—SBR 1502

Stock smoothness



Mooney Viscosity

ZEOLEX 23	59
Silicate	62
Silica/Clay	81

MS—4′ @ 212°F.

For whiter, brighter products—use ZEOLEX® 23.

HUBER **J. M. HUBER CORPORATION** 630 Third Avenue, New York 17, N. Y.

Carbon Blacks • Clays • Rubber Chemicals

Our latest ZEOLEX 23 bulletin gives a lot of compounding information. Write for it.

What's Ahead...?

Once again, so soon again it seems, we come to that period of the year when it is traditional to evaluate our past year and take a long look at the year ahead and the future.

While the picture for 1961 is not all dark and gloomy, few of us can look back at the kind of year we hoped might be in store for us when we paused a year ago. There were, however, some bright spots. Many learned to economize, technology continued to develop new materials and products, and, happy news for the consumer at least, much of the raw material price spiral was halted or even reversed.

So much for the past, what of the future? As we move well into the decade of the '60's, how do we assess our chances of making the predictions of the "golden," "glowing," or "soaring" Sixties come true?

The crystal balls (and staffs of hard-working market research departments) of two organizations produced encouraging news at the Rubber Manufacturers Association annual meeting. RMA President Ross Ormsby predicted that new rubber consumption in 1962 would rise more than 7½% over present levels. At the same time, Firestone's T. G. MacGowan predicted a sales increase of between 130 and 156% for the industry by 1975. Certainly very heartening news to hear.

It is well worth noting, however, that this growth will not be served up on a silver platter. Mr. MacGowan concluded his talk by saying:

"In my view the signs and portents are there, pointing to a splendid period of growth and development in any case, and to a spectacular one if the elements in the industry show the initiating power required to meet the challenge, and, in so doing, grasp the opportunity that lies before them."

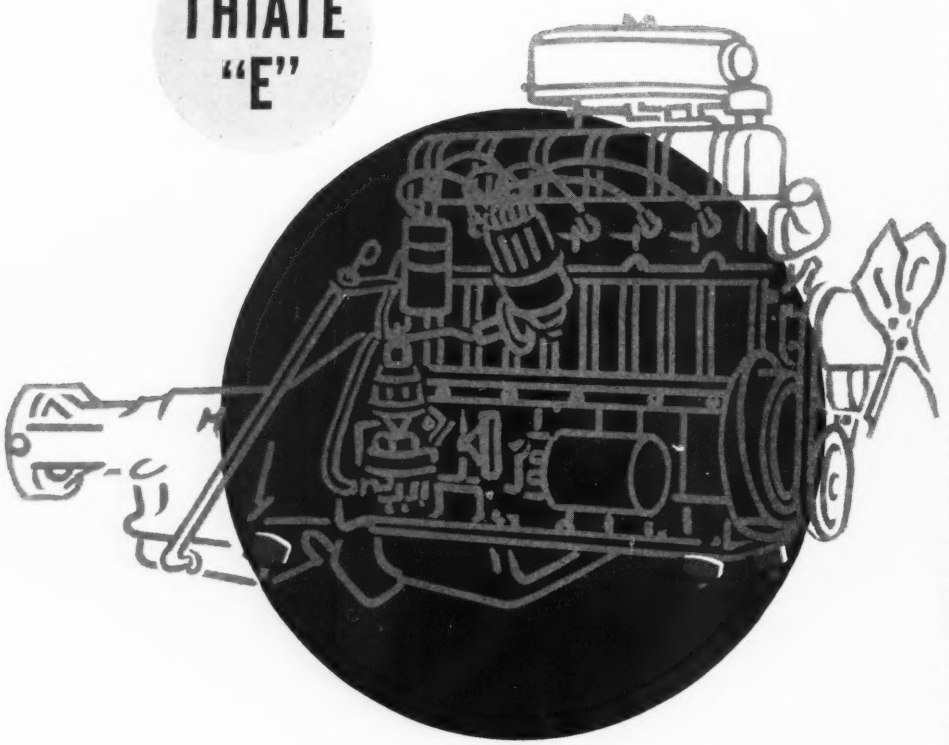
In other words, we must show imagination, courage, and good old-fashioned hard work to make the future bright.

So . . . Season's Greetings to you all and the best wishes of RUBBER WORLD for a bright, shiny, record-breaking 1962.

R. S. Walker

EDITOR

THIATE "E"



Thiate E—accelerator for neoprene—offers low compression set, uniform quality, attractive cost and processing safety—Thiate E works for you—all the way

R. T. Vanderbilt Company, Inc.

230 PARK AVENUE • NEW YORK 17

ACCELERATORS
Altax®
Amax®
Amax® No. 1
Captax®
Rotax®
Bismate®
Cumate®
Ledate®
Ethyl Selenac®
Methyl Selenac®
Sulfads®
Tellurac®
Thiate® A
Thiate® B
Ethyl Tuads®
Methyl Tuads®
Unads®
Butyl Zimate®
Ethyl Zimate®
Methyl Zimate®
Butyl Eight®

ANTIOXIDANTS
AgeRite® Alba
AgeRite® DPPD
AgeRite® Gel
AgeRite® Hipar
AgeRite® HP
AgeRite® ISO
AgeRite® Powder
AgeRite® Resin
AgeRite® Resin D
AgeRite® Spar
AgeRite® Stalite
AgeRite® Stalite S
AgeRite® Superflex
AgeRite® Superlite
AgeRite® White
AKOMATIC ODORS
Rodo® No. 0
Rodo® No. 4
Rodo® No. 10
BONDING MATERIALS
Braze® Bonding Agent
Braze® H Bonding Agent
Braze® Cover Cement for Butyl
Braze® Cover Cement for Neoprene
Braze® Cover Cement for Rubber & SBR
COATING MATERIALS
VanWax®
Black-Out®
CROSSLINKING AGENT
Varox®
FUNGICIDES
Vancide® 26 EC
Vancide® 51 Z
Vancide® 89
LATEX CHEMICALS
Darvan® Dispersing Agents
Dispersed Sulfur
Butyl Namate®
Setsit® 5
Setsit® 9
Zetax®
Compounding Dispersions
Vulcanizing Dispersions
MINERAL FILLERS
Dixie Clay®
McNamee® Clay
Par Clay®
Pyrax®
Nytal®
MINERAL RUBBER
Hard Hydrocarbon
OZONE RESISTANT
Tysonite®
VINYL-RESIN STABILIZERS
Vanstay® A
Vanstay® AB
Vanstay® AC
Vanstay® CE
Vanstay® HT
Vanstay® HTA
Vanstay® HTB
Vanstay® HTC
Vanstay® HTE
Vanstay® L
Vanstay® R
Vanstay® RR
Vanstay® RRZ
Vanstay® RZ-25

ACCELERATORS
Altax®
Amax®
Amax® No. 1
Captax®
Rotax®
Bismate®
Cumate®
Ledate®
Ethyl Selenac®
Methyl Selenac®
Sulfads®
Tellurac®
Thiate® A
Thiate® B
Ethyl Tuads®
Methyl Tuads®
Unads®
Butyl Zimate®
Ethyl Zimate®
Methyl Zimate®
Butyl Eight®

ANTIOXIDANTS
AgeRite® Alba
AgeRite® DPPD
AgeRite® Gel
AgeRite® Hipar
AgeRite® HP
AgeRite® ISO
AgeRite® Powder
AgeRite® Resin
AgeRite® Resin D
AgeRite® Spar
AgeRite® Stalite
AgeRite® Stalite S
AgeRite® Superflex
AgeRite® Superlite
AgeRite® White
AKOMATIC ODORS
Rodo® No. 0
Rodo® No. 4
Rodo® No. 10
BONDING MATERIALS
Braze® Bonding Agent
Braze® H Bonding Agent
Braze® Cover Cement for Butyl
Braze® Cover Cement for Neoprene
Braze® Cover Cement for Rubber & SBR
COATING MATERIALS
VanWax®
Black-Out®
CROSSLINKING AGENT
Varox®
FUNGICIDES
Vancide® 26 EC
Vancide® 51 Z
Vancide® 89
LATEX CHEMICALS
Darvan® Dispersing Agents
Dispersed Sulfur
Butyl Namate®
Setsit® 5
Setsit® 9
Zetax®
Compounding Dispersions
Vulcanizing Dispersions
MINERAL FILLERS
Dixie Clay®
McNamee® Clay
Par Clay®
Pyrax®
Nytal®
MINERAL RUBBER
Hard Hydrocarbon
OZONE RESISTANT
Tysonite®
VINYL-RESIN STABILIZERS
Vanstay® A
Vanstay® AB
Vanstay® AC
Vanstay® CE
Vanstay® HT
Vanstay® HTA
Vanstay® HTB
Vanstay® HTC
Vanstay® HTE
Vanstay® L
Vanstay® R
Vanstay® RR
Vanstay® RRZ
Vanstay® RZ-25

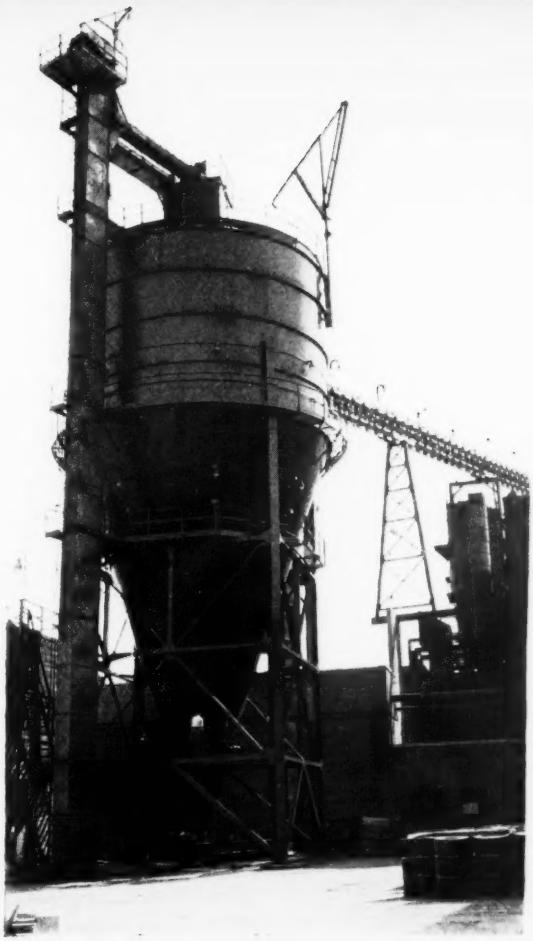


Fig. 1. Carbon black storage tower, 95 feet in height. Each of the eight compartments in this tank will hold 100,000 pounds of black

Automatic Carbon Black Handling

Unique system distributes black from storage silo to Banbury in tire plant with no human attention necessary

By JOHN AQUADRO

Richardson Scale Co., Clifton, N. J.

A COMPLETELY automatic carbon black handling system is a major feature of Firestone Tire & Rubber Co.'s huge tire manufacturing operation in Pottstown, Pa. The black is moved from storage to Banbury mixer without attention, once the system is started.

"It was a matter of setting it and forgetting it," as Firesone put it. "Our mixer hoppers are always supplied with the proper grade of carbon blacks, available whenever called for in a batch."

Six grades of carbon black are automatically distributed from the storage tank to 20 different supply hoppers above four Banburys . . . without mixing or missing any of the grades. At the same time a control panel indicates by signal lights exactly what is happening, the condition or need of each supply hopper. Supply in hoppers is always maintained ahead of the demand by the Banburys. The system is designed to be foolproof by being completely interlocked, with an audible alarm sounding for any non-normal condition . . . in addition to signal lights to show progress of cycling. The panel includes seven motor load indicators for conveyors and elevator so that any motor receiving an unusually heavy load is reported instantly on the control panel indicator.

The distribution system, designed, engineered, and manufactured by Richardson Scale Co., Clifton, N. J., is also arranged for full manual control of all operations—selection of grades, transfer to any supply hopper, and Banbury—with full interlocks in manual as well as automatic operation.

Eight-Compartment Main Storage

There are eight main storage bins, each holding a different grade of carbon black, each with a capacity of 100,000 pounds. These bins are enclosed in a 95-foot-high storage tower (Figure 1), fed by elevator from rail hopper cars at a nearby siding. A distribution turnhead at the top of the tower moves automatically to the bin selected by signal from the control panel. From rail car to Banbury, the entire system is completely enclosed, eliminating a difficult problem in housekeeping normally associated with carbon black.

At present, two of the Banburys have six supply hoppers each, and the other two have four each, for a total of twenty. Provision has been made to add four more supply hoppers so that each Banbury will have six, and to add a complete set-up for a fifth Banbury.

Here is the actual sequence of events when the distribution system is set on automatic, and the panel preset for the grade of carbon black wanted at each supply hopper.

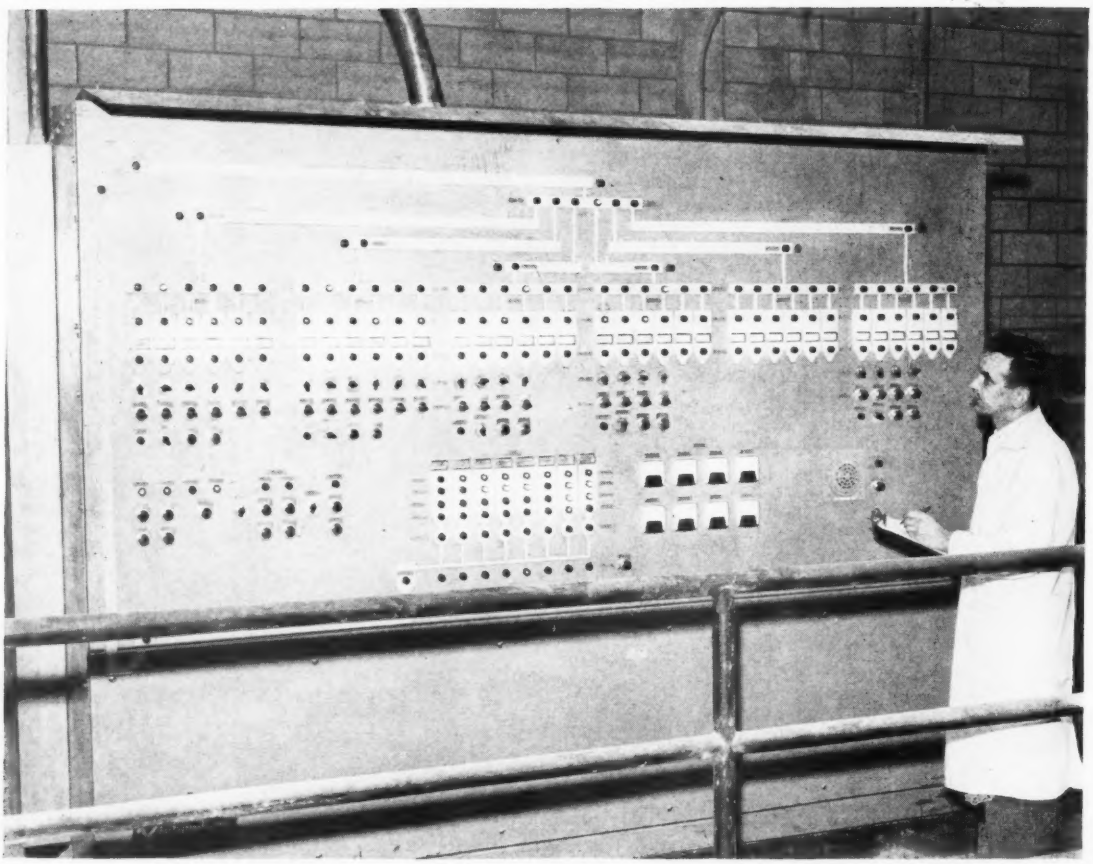


Fig. 2. Graphic control panel for automatic distribution of carbon black from storage to Banbury

Operation of the System

Power to the graphic control panel (see Figure 2) is controlled by two push-buttons. With power on, the selector switch is turned to automatic control. Both of these steps are indicated by pilot-lights. Selector switches are also set for the material required for each bin. With these switches set properly, a start button can be pressed to get the system operating.

The system will now begin to scan the Banbury supply hoppers when any control indicates that the bin is at low level. The scanning is done in sequence from bin #1 through bin #20. When the low-level scanner reaches a bin requiring material, the carbon black selector scanner is automatically activated and identifies the black for which this hopper has been set. A pilot-light indicates that the proper bin in the main storage will cycle.

Sequence of Operations

Let us assume that the hopper needing replenishment is the first hopper over the first Banbury and that the carbon black called for is HAF. The sequence of operations is as follows.

The rotary spout above this Banbury, if not already in position, will turn until it is directed to the first bin. At the same time the main rotary spout (See Figure 3) will turn so that it is set to feed the conveyor leading to Banbury #1.

With both spouts in position, the conveyor feeding this Banbury station will start. The system then works back toward the storage tower. The conveyor feeding the main rotary spout will start. The elevator feeding this conveyor will then start. The conveyor feeding the elevator will start. The vibrator feeding this conveyor will start. And finally, the vane feeder below the storage compartment holding HAF black will start.

Thus the entire system is running empty when the black is introduced into the system. HAF black will now flow through the system and fill the hopper which has been selected.

When the hopper reaches the high level mark, all of the conveying devices between the storage tower and the main rotary spout will stop. This portion of the system will still contain the HAF black. The conveyor between the main spout and the Banbury station will continue to run, however, for a preset time to purge itself of this grade of black.

The low-level scanner will then reactivate to search for any other bins requiring this HAF type of black. Any HAF hopper not at the high-level condition will then be filled in a similar manner.

Cleanout of System

When every hopper requiring HAF black has been filled, the system enters a main cleanout condition. Each of the conveying devices will start up in sequence as in the initial operation, but the feed from the main storage tank will be closed. The system will then continue to operate until sufficient time has elapsed for all of the HAF black to be delivered to the final hopper to be filled. The system will then shut itself off until started again by another low-level alarm. The entire sequence will then be repeated with the hoppers and type of carbon black selected.

Most of the steps described above are visually indicated on the control panel by pilot-lights for the operator's information. There is also an alarm, audible and visual, to indicate that the filling operation has not been completed within a preset interval, thus notifying of some abnormal condition causing slow filling. This alarm must be shut off manually. When the cause of the slow filling has been identified and rectified, the system will continue the filling and cycle as before.

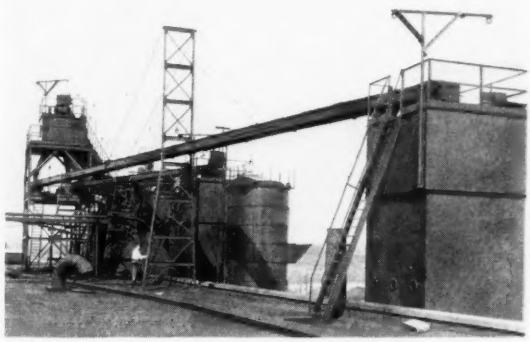


Fig. 3. Distribution tower for carbon black *(left)* with conveyors leading to Banbury supply hoppers (square towers). The main rotary distribution spout is at the top of the structure

System Can Be Stopped

The operator may stop the scanning operation at any time by turning a switch to hold position. There is also a cleanout switch for each of the 20 supply hoppers to permit their being completely emptied even through the automatic scanning of the other hoppers continues in operation.

Along with the stop controls of these various steps, there is a master emergency-stop circuit which will stop all equipment immediately. The system can then be restarted manually with the same switch used to start the scanning initially.

Black Weighed to Banbury

Carbon black handling in this plant extends to feeding of the Banbury hopper. Exact amounts of carbon black and oils are proportioned automatically by means of a Richardson "Select-O-Weigh" system. (Figure 4.) The operator sets up the proper formula from the more than 800 Firestone compounds and presses the start button. This actuates the system, and causes each ingredient to be fed in turn to automatic scales, where they are weighed in amounts determined by the preset formula.

The resulting masterbatch is then ready for the steps of pelletizing, addition of curing agent, and processing for delivery to the tire building area.

Quality Controlled

This black handling system is designed to fit in with the overall quality-control program at the Firestone's Pottstown plant. The program includes continuous laboratory and in-plant quality-control testing to insure the presence of proper amounts and types of ingredients as well as proper processing procedures.

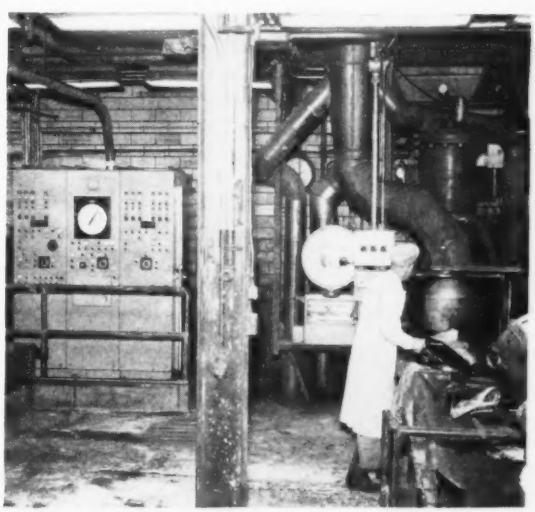


Fig. 4. "Select-O-Weigh" system on Banbury for automatic weighing of ingredients to batch selected

The Author

John W. Aquadro is manager of electrical engineering for Richardson Scale Co., Clifton, N. J. A graduate of Newark College of Engineering with a degree of Bachelor of Electrical Engineering, he joined Richardson Scale in 1949 and was manager of the electrical laboratory for the company prior to his appointment to his present position in 1956.

Mr. Aquadro is an authority on remote formulation systems, having been involved in their development since their inception. He is a member of Instrument Society of America.

Polyolefins Improve Heat Aging Of Clay-Loaded Butyl Insulation

Substitution for as little as 10% of butyl polymer increases water and high-temperature resistance

By F. RODRIGUEZ and C. C. WINDING
Cornell University, Ithaca, N. Y.

THE substitution of low melt-index, linear polyethylene for as little as 10% of the butyl polymer in clay-loaded butyl insulation gives a material with a combination of water and high-temperature resistance, coupled with electrical reliability, not previously available. The mechanism remains obscure.

Flexible electrical insulation for use under hot, moist conditions must meet an imposing array of performance specifications. At about 75° C. (167° F.), the requirement of dimensional stability restricts the field primarily to vulcanized elastomers. Low cost, compared with other rubbers having low unsaturation, has made butyl rubber particularly attractive for this purpose.

The investigation outlined here shows that addition of certain polyolefins can cause an increase in tensile strength on heat aging, at the same time increasing original modulus and decreasing original elongation. The percentage of original elongation retained on heat aging, and the electrical stability of the base compound, however, are not changed markedly by polyolefin addition.

We believe that this effect allows butyl rubber insulation to withstand high physical stresses even after having been subjected to high conductor or environmental temperatures.

The use of polyethylene as a modifier with black reinforcing fillers appears to offer little advantage on heat aging. However, with calcined clay, talc, and a thermal black, tensile strength on aging is invariably improved; while elongation is relatively unaffected. The superior elongation stability with silica is worth noting.

Investigation also showed that stearic acid, used as a lubricant with the "quinoid" cure systems for butyl rubber, tends to decrease tensile strength on aging. This effect of stearic acid has not been noticed in other systems. The reasons for the effect are not yet clear.

The polyolefins investigated in this study included several different types, further subdivided by melt index or molecular weight (Table 1):

(a) Branched polyethylene.
(b) Medium-branched polyethylene.
(c) Linear polyethylene.
(d) Linear copolymers of polyethylene.
(e) Isotactic polypropylene.

TABLE 1. POLYOLEFINS TESTED

Type	Name	Melt Index	Manufacturer
Linear high-density polyethylene	Hifax 1700 E	0.1	Hercules Powder Co., Wilmington, Del.
	Hifax 1604	0.16	Hercules
	Hifax 1401	0.14	Hercules
	Fortiflex A20	0.1-1.0	Celanese Corp. of America, New York, N. Y.
	A-C Grade 150	15	Allied Chemical Corp., New York, N. Y.
Polypropylene	Profax	—	Hercules
Copolymers of ethylene and 1-butene	Fortiflex B50-80	0.8	Celanese
	Fortiflex B50-30	0.5	Celanese
Medium-density polyethylene	Polyeth HiD 2504	1.0	Spencer Chemical Co., Kansas City, Mo.
Branched polyethylene	Alathon 10	2.1	E. I. du Pont de Nemours & Co., Inc., Wilmington
	Dylan 3700	2.5	Koppers Chemical Co., Pittsburgh, Pa.
	Dylan 3900	9.0	Koppers
	Dylan 4400	22.5	Koppers

Both the type of polyolefin and its melt index were found to have considerable bearing on activity in reducing heat aging.

Testing Procedures

A widely recommended formula for butyl insulation uses calcined clay as a filler and a "quinoid" system[1] as curative. The base formula used in investigating polyolefin substitution was:

[1] Polymer Corp. Ltd., Sarnia, Ont., Canada, "Polymer Handbook," Vol. 1, p. 386 (1956).

	Parts by Weight
Butyl rubber	100
Zinc oxide	5
GMF (quinone dioxime)	2
MBTS (benzothiazyl disulfide)	4
Red lead	7.5
Polyolefin	variable
Filler	variable
Lubricant	variable

Fillers were incorporated into butyl rubber (Enjay 035)[2] either on a hot (300° F.) 6 by 12 two-roll mill, or in a "Midget" Banbury (200° F. discharge).

Where mixtures of polyolefin and rubber were used, they were homogenized at 300° F. on the two-roll mill. Curatives were added on a warm (140° F.) mill, and mixing consisted of 10 passes through a tight mill with rolling. Curatives were added on the basis of butyl content; while filler was added on the basis of total polymer content (butyl plus polyolefin).

Tensile testing was done on standard dumbbells according to ASTM D 412-51T, one inch between bench marks.

For measurement of dielectric constant and power factor at 1,000 cycles per second, a capacitance bridge and a special sample holder were used. The sample holder consisted of an upper unguarded electrode and a lower, guarded electrode, four inches in diameter. Volume resistivity was measured on slabs (0.08-inch by 6 by 6 inches) with embedded brass electrodes (0.05-inch by 1.25 by 3.0 inches) at an imposed potential of 500 to 600 volts d.c. Dielectric constant and power factor were measured on dry samples at room temperature, and resistivity was run on samples immersed in water at 194° F.

Railsback and Wheat[3] have reported that the cold flow characteristic of unvulcanized butyl rubber compounds can practically be eliminated by inclusion of 10 phr. of linear polyethylene. Similarly, the present investigation showed that modulus is doubled by substitution of 10 phr. of linear polyethylene in the presence of a variety of fillers (Table 2), ultimate elongation is lowered 25% by substitution of 10 phr. of linear polyethylene, and up to 40% by addition of up to 40 phr., and tensile strength is comparatively unaffected.

[2] Enjay Chemical Co., a division of Humble Oil & Refining Co., New York, N. Y.
[3] *Rubber Age (N. Y.)* 83, (1958).

TABLE 2. EFFECT ON MODULUS

Filler	Loading	200% Modulus, Psi. All-Butyl Polymer	200% Modulus, Psi. 90% Butyl, 10% Polyethylene*
None	—	120	214
Channel black†	50	765	1,350
Thermal black‡	50	275	620
Silica§	25	240	735
Calcined clay¶	108	330	840
Talc¶	50	490	785

The all-butyl compound includes 5 phr. zinc oxide; 2 phr. GMF‖, 4 phr. Altax**, and 7.5 phr. red lead. The 90% butyl/10% polyethylene has 4.5 phr. zinc oxide, 1.8 phr. GMF, 3.6 phr. Altax, and 6.75 phr. red lead.

* Hifax 1700.
† Micronex W-6, Columbian Carbon Co., New York, N. Y.
‡ P-33, R. T. Vanderbilt Co., Inc., New York, N. Y.
§ Cab-O-Sil, Cabot Corp., Boston, Mass.
¶ Mistron Vapor, Sierra Talc Clay Co., South Pasadena, Calif.
‖ p-Quinonedioxime, Naugatuck Chemical Division, U. S. Rubber Co., Naugatuck, Conn.
** Altax, Benzothiazyl disulfide, R. T. Vanderbilt Co.

TABLE 3. POLYETHYLENE EFFECT ON AGED TENSILE

Butyl 035	100	90	80	60
Hifax 1600	—	10	20	40
Zinc oxide	5	4.5	4	3
GMF	2	1.8	1.6	1.2
Altax	4	3.6	3.2	2.4
Red lead	7.5	6.75	6	4.5
Days in Air Oven, at 250° F.	Ultimate Tensile, Psi.			
0	820	805	840	875
1	700	945	1,105	—
2	730	980	1,125	—
4	725	1,005	1,170	—
7	765	1,040	1,200	1,290
12	735	1,090	1,250	—
18	680	960	1,175	—
23	650	910	1,085	—
30	655	970	1,145	—
Days in Water Bath, at 194° F.				
7	660	745	975	—
21	550	680	895	—

Heat Aging

The changes in heat aging behavior are much more

TABLE 4. POLYETHYLENE EFFECT ON AGED ELONGATION

Butyl 035	100	90	80	60
Hifax 1600	—	10	20	40
Zinc oxide, GMF, Altax, Red lead	Same as Table 3			
Days in Air Oven, at 250° F.	Elongation, %			
0	605	520	370	190
1	415	280	255	—
2	345	265	270	—
4	295	230	180	—
7	280	200	175	90
12	250	180	190	—
18	260	185	170	—
23	255	200	180	—
30	260	185	175	—
Days in Water Bath, at 194° F.				
7	490	355	215	—
21	385	350	220	—

The Authors

Ferdinand Rodriguez, assistant professor of chemical engineering at Cornell University, is a consultant for Rome Cable Division of Aluminum Corp. of America, and Union Carbide Chemical Co. Prior to assuming teaching duties at Cornell he was development engineer for Ferro Chemical Corp., Bedford, O. He received his B.A. (1950) and M.A. (1954) in chemical engineering from Case Institute of Technology, Cleveland, O., and his Ph.D. from Cornell in 1958. He is a member of the American Chemical Society, the American Institute of Chemical Engineers, and also the Society of Plastics Engineers.

Charles C. Winding, director of the School of Chemical & Metallurgical Engineering at Cornell University, joined Cornell as an instructor in 1935 after receiving his Ph.D. from the University of Minnesota, becoming a full professor in 1944, and was named to his present post in 1957. He has been a consultant to a number of industrial organizations, including the B. F. Goodrich Co., and presently is a consultant for both Rome Cable Division and Cowles Chemical Co. He holds more than a dozen patents and is the author of many papers on a number of subjects, including plastics and rubbers. He is co-author of two books, "Plastics, Theory and Practice," published in 1947, and "Polymeric Materials," published earlier this year. He is a member of the American Chemical Society, American Institute of Chemical Engineers, American Society for Engineeing Education, and Society of Plastics Engineers, and a Fellow of the American Institute of Chemists.

marked. Substitution of a linear polyethylene for butyl rubber, which changes the original tensile strength only slightly, increases tensile strength markedly after aging up to 30 days in an air oven at 250° F. (Table 3). Although original elongation is reduced by addition of polyethylene, retention of elongation is almost unchanged (Table 4).

Similarly, addition of polyethylene increases retention of tensile strength after aging 21 days in hot (194° F.) tap water. However, this addition slightly lowers retention of original elongation.

The somewhat different results obtained by the two methods of aging may be explained in terms of the possible chemical reactions. In the oven, with a good supply of oxygen, the predominant reaction may be oxidative crosslinking and scission. In the water bath the primary reaction may be reversion.

In comparing different types of polyolefins, tests showed that none affects original strength greatly, although high molecular weight linear polyethylene tends to raise tensile strength, and low molecular weight branched polyethylene tends to lower it (Table 5).

On the other hand, the spread in aged tensile strength shows a distinct cleavage. Linear polyethylenes and polypropylene raise aged tensile strength above original tensile strength; while branched polyethylenes have aged tensile strength not only lower than original tensile strength, but lower than the aged tensile strength of the control.

Copolymers and a medium branching polyethylene are intermediate, showing aged tensile strength equal to or slightly better than original tensile.

Among the linear polyethylenes there is also greater differentiation among aged samples than among original samples. Those with higher aged strength and with the greatest percentage increase of aged strength over original strength are those of higher molecular weight (lower melt index.)

TABLE 5. DIFFERENCES IN POLYOLEFINS

Polymer Type	Polyolefin*	Melt Index	Tensile, Psi.		Elongation, %	
			Original	Aged*	Original	Aged†
Control		—	760	740	595	255
Linear polyethylene	Hifax 1700E	0.1	895	1,065	365	175
	Hifax 1604	0.16	805	1040	520	200
			880	1055	—	—
	Hifax 1401	0.14	785	805	585	235
	Fortiflex A20	0.2	785	855	425	205
	Super Dylan 6600	0.1-1.0	750	845	510	215
	Fortiflex A500	5.0	725	775	525	220
	A-C Grade 150	15	720	730	500	205
Polypropylene	Profax	—	755	975	250	135
Linear copolymers	Fortiflex B50-80	0.8	790	780	560	225
	Fortiflex B50-30	0.3	775	895	415	215
Medium-density polyethylene	Polyeth HiD 2504	1.0	730	780	550	245
Branched polyethylene	Alathon 10	2.1	740	730	565	235
	Dylan 3700	2.5	575	700	455	230
	Dylan 3900	9.0	655	705	530	255
	Dylan 4400	22.5	660	630	450	245
			750	750	595	235

* 10 parts to 90 parts butyl polymer. Cure formula as in Table 2.

† Aged 7 days in air oven at 250° F.

TABLE 6. EFFECT OF FILLERS ON AGED TENSILE*

Days in Air Oven at 250° F.	All-Butyl Polymer				90% Butyl/10% Polyethylene			
	EPC Black	FT Black	Silica	Talc	EPC Black	FT Black	Silica	Talc
0	2295	1240	2215	1085	2150	1135	1985	1095
1	1890	770	2130	840	1935	975	2060	1080
5	1715	710	1780	760	1820	985	1670	1070
7	1510	690	1760	735	1670	945	1645	1060
21	1105	710	1435	720	1320	955	1500	1030

* Loadings and cure formulas as in Table 2.

TABLE 7. EFFECT OF FILLERS ON AGED ELONGATION*

Days in Air Oven at 250° F.	All-Butyl Polymer				90% Butyl/10% Polyethylene			
	EPC Black	FT Black	Silica	Talc	EPC Black	FT Black	Silica	Talc
0	515	685	825	655	385	600	745	470
1	335	460	755	475	245	385	705	330
5	310	360	700	290	225	340	580	295
7	290	335	680	340	220	315	570	275
21	300	330	605	305	205	280	495	230

* Loadings and cure formulas as in Table 2.

Electrical Stability

On immersion in hot water, certain grades of electrical insulation are expected to show only small changes in power factor, dielectric constant, and volume resistivity.[4] The excellent electrical properties of pure polyolefins are well known, but in a clay-filled system, with an unvulcanized polyolefin in hot water, one might predict rapid failure. This is because of the added mobility of the filler in a partly thermoplastic matrix.

As a matter of fact, this is not so. The power factor and dielectric constant are unaffected by addition of polyethylene even though the filler is the same fraction of the total compound as of the butyl compound without a polyethylene additive.

Measurements of volume resistivity are much more difficult to reproduce. Experience with a variety of compounds, however, leads to the conclusion that polyethylene and polypropylene have little or no effect on this property over periods of aging much longer than those usually specified. Class RHW rubber is tested 12 to 24 weeks at 75° C.[5]

Effects of Filler

In a compound with reinforcing fillers, use of polyethylene as a modifier appears to offer little improvement of heat aging. With calcined clay, talc, and thermal black, tensile strength on aging is improved, and elongation is relatively unaffected. Superior elongation stability is obtained with silica (Table 6 and 7).

In many accelerated sulfur curing systems, stearic acid is an essential activator. In the "quinoid" system used in these investigations, stearic acid plays a less prominent role, being used primarily as a lubricant. Original physical properties are little affected by small amounts of this material. However, on heat-aging up to 21 days at 121° C., the acid causes a loss in tensile although giving a better retention of elongation.

Further tests were made with an ester of stearic acid (polyvinyl stearate) and with benzoic acid, to see whether the adverse effects were due to the carboxylic acid or to the hydrocarbon "tail" of stearic acid. The tests were inconclusive (Table 8). If stearic acid is replaced by the ester, tensile retention is stilll inferior to that of the control. Benzoic acid, at an equivalent concentration of carboxyl group, does not appear to pull down tensile strength on aging as much as stearic acid. While better than polyvinyl stearate and stearic acid, however, benzoic acid is also slightly inferior to the control.

Further investigation would be necessary to determine a substitute for stearic acid as a lubricant which would not affect aging. Benzoic acid, of course, makes processing difficult instead of acting as a lubricant.

Explaining Polyethylene's Effect

The peculiar effect of polyethylene on tensile strength in heat aging is difficult to explain.

One might postulate some sort of oxidative crosslinking of polyethylene and butyl on heating. But hot xylene extracts polyethylene quantitatively from both aged and unaged samples. Moreover, the swelling of the residual butyl-clay compound in xylene at room temperature was the same whether polyethylene was present or not.

Since clay does not modify volume swell based on

(Continued on page 84)

[4] Underwriters' Laboratories, Inc., "Rubber Covered Wires and Cables," Fifth Ed., Chicago, (1956).
[5] Underwriters' Laboratories, Standards UL 44, Sixth Edition.

New Techniques for Evaluating Pigment Dispersion in Rubber—II[1]

Modern microtoming techniques make possible sample preparation of all pigment loaded rubbers for microradiography, light and electron microscopy

By WILLIAM M. HESS

Columbian Carbon Co., Princeton, N. J.

SEVERAL different techniques of transmission microscopy are available for evaluation of pigment dispersion in rubber. These include light microscopy, electron microscopy, and microradiography.

Part I of this article, in the November issue of Rubber World, discussed in detail the results obtainable by using one type or a combination of these types of transmission microscopy. Part II will deal with the techniques of preparing and studying specimens for each type.

Suitably thin specimens must, of course, be employed for transmission microscopy. A simple, very versatile, liquid nitrogen freezing technique has been developed for the thin sectioning of rubber on a microtome. Most rubber polymers can be readily sectioned as thin as 0.1- to 0.05-micron. Specimens thus can be easily prepared for examination by all forms of transmission microscopy.

The microscopic technique employed in a given analysis depends on the type of pigment and the degree of resolution necessary.

The light microscope is always used first in the dispersion evaluation of carbon loaded stocks. The most damaging agglomerations of black are visible at fairly low power under a light microscope. Microradiography, which uses differences in X-ray absorption to show up undispersed pigment agglomerates, is applicable whenever there is a significant difference in specific gravity between pigment and polymer. It is excellent, therefore, for resolving agglomerates of high-density pigments such as zinc oxide and calcium carbonate and is also used for studies on unvulcanized rubber, since it can examine relatively thick samples, which do not tend to shred apart so readily during handling as do thin specimens of raw stock.

Electron microscopy is used both to resolve the size and the shape of the ultimate pigment particles and to compare dispersion quality when other methods have failed to show a difference.

Finally, special tensile specimen holders are now used for both microradiography and electron microscopy in order to study directly the effects of dispersion quality on rubber samples under strain.

Specimens for microscopic examination can be prepared with the least physical distortion by using a microtome to cut the rubber sample into a series of uniform cross-sections. The thickness of these sections is dependent on the type of microscopic technique with which they are to be examined.

Light microscopy and, even more so, electron microscopy require very thin preparations: 2-4 microns for light, and 500-1000 Å for electron microscopy. Microradiography can accommodate much thicker specimens, up to 40 microns in thickness.

The electron microscope examination of rubber compounds has been limited by the difficulty of obtaining suitably thin specimens. High speed microtomy was employed successfully by Ladd[2] in 1945. More recently, a technique for frozen sectioning with dry ice on a conventional rotary microtome was developed by Chappuis and Robbles.[3]

Microtoming Techniques

In order to section rubber thin enough for microscopic examination, it must first be hardened. One method of meeting this requirement is methacrylate embedding.[4] However, the quickest and simplest means is freezing. This is also the procedure that is least likely to alter the internal structure of the rubber.

Many rubber compounds can be suitably hardened for microtomy by means of a standard carbon-dioxide freezing stage. Liquid nitrogen, however, is a considerably more efficient freezing agent and is applicable for sectioning a wider variety of rubber compounds at different thickness levels. By the complete immersion of the specimen in liquid nitrogen for a set amount of time, freezing conditions can be duplicated quite closely from one operation to another.

Two different types of microtome have been employed extensively for this frozen sectioning work. These are the Leitz sledge microtome[5] and the Porter-Blum

[1] Based on "Analysis of Pigment Dispersion in Rubber by Means of Light Microscopy, Microradiography, and Electron Microscopy," presented before the Division of Rubber Chemistry, ACS, Louisville, Ky., Apr., 1961.
[2] W. A. Ladd, H. A. Braendle, *Rubber Age (N.Y.)*, 57, 681 (1945).
[3] RUBBER WORLD, 136, 391 (1957).
[4] M. M. Chappuis *et al.*, RUBBER WORLD, 130, 507 (1954).
[5] E. Leitz, Inc., New York, N. Y.

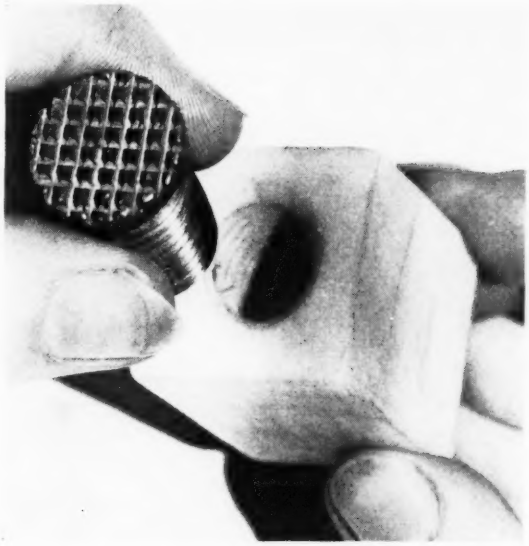


Fig. 1. Laboratory worker assembles specimen mount for sectioning sample on Leitz microtome. Mount is simply brass cylinder screwed into Teflon block. After sample is embedded in glue on scored surface, mount is immersed in liquid nitrogen.

rotary microtome.[6] The former instrument is used for all the light microscope and X-ray work, as well as some electron microscope studies; while the latter is used exclusively for preparing electron microscope specimens.

In order to maintain the frozen state of the rubber sample while it is being sectioned, a simple, but very effective specimen mount is employed. For the Leitz microtome this consists of a cylinder of brass which is threaded into a rectangular block of Teflon. These are shown in Figure 1. The rubber specimen to be microtomed is first embedded in a slightly thickened water soluble mucilage on the top surface of the brass. This surface is deeply scored to provide a firm mount. After immersion in liquid nitrogen, the brass quickly assumes a low temperature and will keep the rubber and supporting glue frozen for several minutes. The Teflon insulation permits a very slow temperature rise.

For most rubber samples a one-minute freezing time is sufficient. This will keep the specimen frozen for about 3-8 minutes and allows ample time for alinement and paring down. For a given set of operating conditions, the optimum time for sectioning can readily be determined.

Figure 2 shows a rubber specimen in position for microtoming with a glass knife. Thin sectioning for light or electron microscopy can be accomplished most efficiently with this type of cutting edge. The relatively large, thick sections that are employed for X-ray studies can, however, be more easily cut with a steel knife.

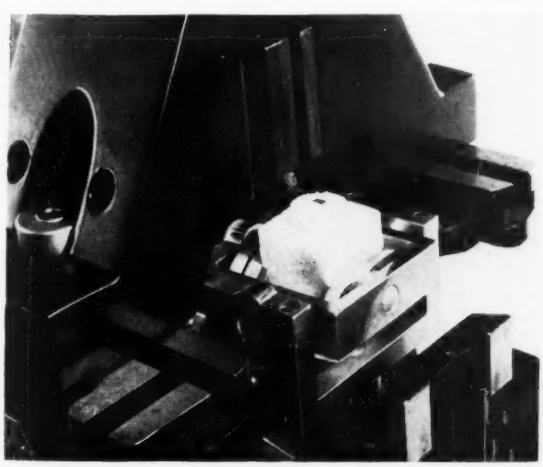


Fig. 2. Rubber specimen is placed in position for microtoming with a glass knife on Leitz sledge microtome. Thin sections can be microtomed this way for light or electron microscopy.

Fig. 3. Specimen holder for frozen sectioning is mounted on Porter-Blum rotary microtome which is capable of cutting rubber specimens to a thickness of 500 Å.

Specimens on the order of two microns thick are necessary for good light transmission of rubber compounds that are highly loaded with carbon black. At this thickness the sections curl badly and stick to the knife edge. In order to uncurl them and subsequently to brush them out flat, they must be swelled in a suitable solvent such as naphtha or xylene. The knife should be continually lubricated during the sectioning operation.

The area swelling factor of the sections ranges from about 50% for styrene butadiene rubber to about 100% for natural rubber. Provided that the sections are removed from the solvent within a reasonable amount of time, the swell does not have any influence on the

[6] Ivan Sorvall, Inc., Norwalk, Conn.

interpretation of the state of dispersion. The actual amount of swell, however, must be taken into account if quantitative measurements are to be made.

Specimens in the thickness range of 10-40 microns are suitable for examination by microradiography. These can readily be handled without swelling. A steel knife lubricated with alcohol reduces the tendency toward curling, and the sections can simply be picked up with a pair of tweezers.

The Leitz sledge microtome is also capable of cutting frozen sections of rubber thin enough for the electron microscope. This can be done by setting the mechanical specimen advance at zero and relying on thermal expansion to raise the specimen. Sections in the thickness range of 500-1000 Å can then be cut quite easily. As for the light microscope, these specimens must also be uncurled in a solvent. In this instance however, they are mounted on standard 200-mesh EM specimen grids containing thin supporting substrates.

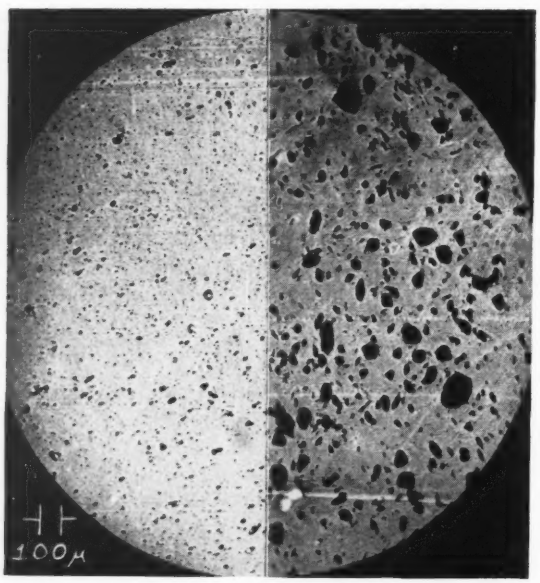


Fig. 4. Light photomicrographs are shown of two rubbers varying greatly in their glassy transition temperatures. These illustrate the versatility of the microtoming techniques outlined. *Left*, a butyl rubber dispersion; *right*, a silicone rubber dispersion.

To eliminate direct handling of rubber specimens for the electron microscope, the sections are cut on a Porter-Blum rotary microtome. The freezing mount is essentially the same as the one used for the Leitz instrument. It is cylindrical in shape and partially capped with Teflon to provide more complete insulation of the brass core. The frozen state of the specimen can thus be maintained for a longer period of time. Figure 3 shows the specimen holder as it is attached to the microtome. The specimen holder can be quickly locked into place by means of a T-slot adapter and a single nylon set screw.

As the sections are cut, they are floated directly on to a water surface where they are subsequently picked up on 200-mesh specimen grids. No swelling or brushing is necessary.

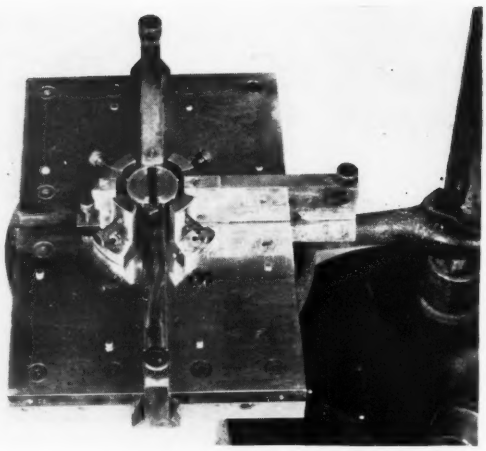


Fig. 5. This X-ray tensile specimen holder is used to observe contrasts between pigment loaded rubber samples relaxed and under strain.

The setup shown in Figure 3 is capable of producing sections of SBR, butyl, and natural rubber in the thickness range of 500 Å. Polymers such as polybutadiene and silicone rubber are usually given a more vigorous freezing action. By means of a container that plugs into the top of the holder, liquid nitrogen can be kept in thermal contact with the rubber as it is sectioned. The specimen can then be kept frozen longer at a higher hardness level.

Figure 4 shows sections of two light photomicrographs of poor black dispersions, one in butyl and the other in silicone rubber. These serve to illustrate the versatility of the microtoming technique in handling polymers that vary greatly in their glassy transition temperature. Thin sections can be cut routinely from most polymers regardless of the pigment loading.

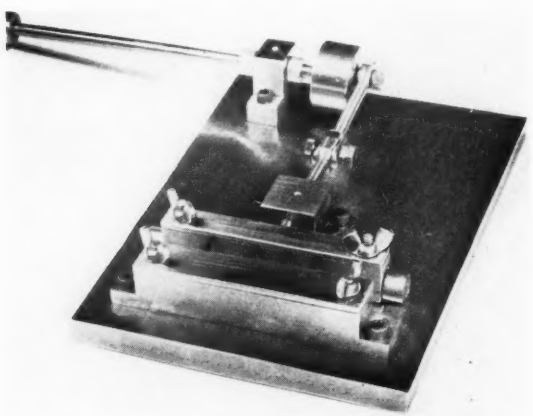


Fig. 6. The micro-extender shown here is used for repeated extension and relaxation of rubber specimens, which are X-rayed to study flex cracking.

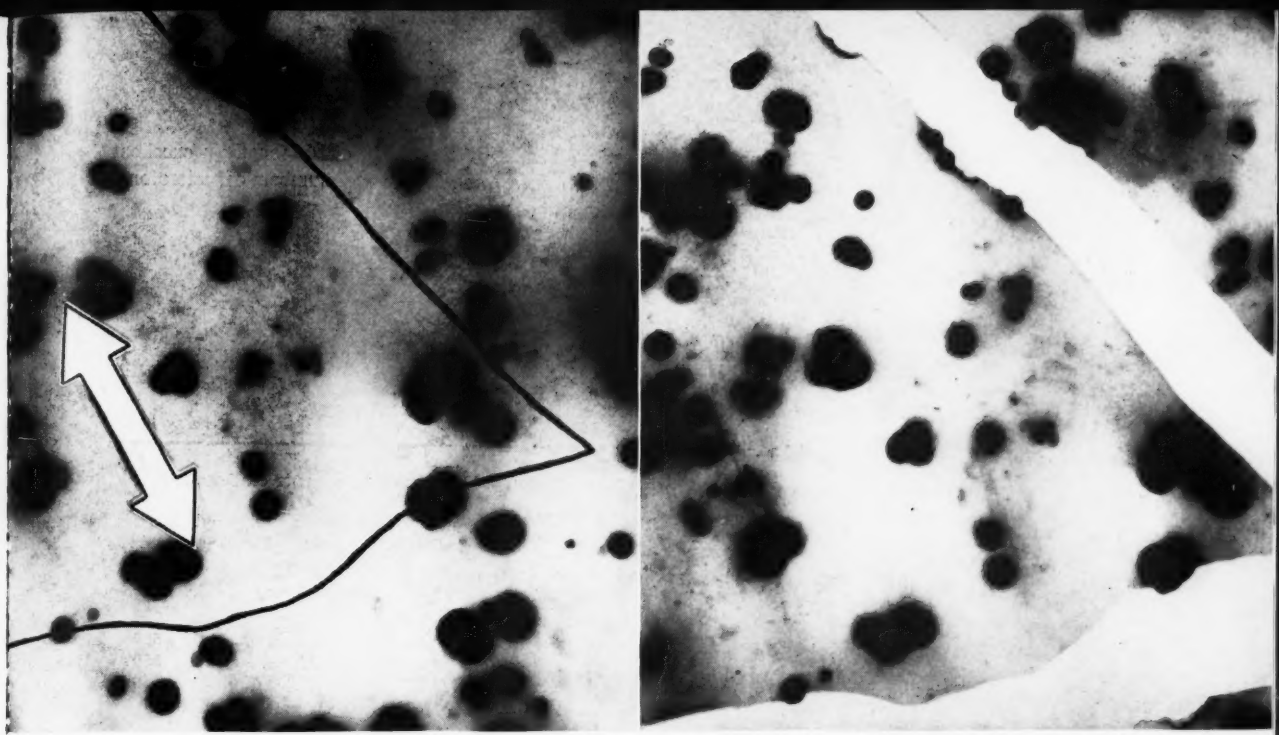


Fig. 7. This electron micrograph of a natural rubber stock containing a 50 phr. loading of Thermax shows the specimen before and after a break was induced by the Wilsdorf tensile specimen holder. In the photograph at left, the arrow shows the direction of stress, and the dark line the place where the break will take place. At right is the ruptured specimen. The unusual triangular nature of the break has apparently been caused by some side stress due to uneven opening of the slit over which the specimen was mounted.

Problems may be encountered, however, when a high-density non-carbon component such as zinc oxide is badly dispersed. These agglomerates tend to chip the microtome knife quite badly. They also shred out during the uncurling operation, thus leaving the sections full of holes. In situations such as this one, it is advisable to supplement the light microscope examination with a microradiography study.

Experience has shown that a specimen 3 by 8 mm. in size will generally be adequate for light microscope analysis of a carbon loaded stock. Conclusions are drawn from direct observation of the sections under the microscope rather than from micrographs. The quality of very poorly dispersed samples can usually be estimated. Better mixes are quantitatively measured with a net micrometer by examining the entire section first at very low magnification (40x) for coarse agglomerates and then partially screening at high magnification (approximately 300x) for the fine ones.

Microradiography

Microradiography studies are performed on a Philips contact microradiography unit[7] which is capable of producing extremely soft X-rays in the 1-5 k.v. range (6-8 Å wave length). The rubber specimens are mounted directly on to the emulsion of the fine grain recording film. A typical exposure for a 20-micron thick sample is four minutes at 3.5 k.v. To increase contrast the accelerating potential of the X-ray beam is dropped, and thinner specimens are used. At 1.5 k.v., exposures on 10-micron thick sections run about 25 minutes, and the specimen chamber must be put under vacuum to prevent air absorption of the X-rays.

Since contact microradiograms are the actual size of the specimen, they must be enlarged, something which can best be done under a light microscope. Negatives can either be directly examined or rephotographed and printed at higher magnification.

X-Ray Tensile Holder

A special tensile specimen holder (Figure 5) has been designed for the Philips CMR microradiography unit. Sections of rubber, cut to a thickness of 40 microns, are clamped down at the ends of two runners which can then be moved and locked into position at the desired specimen elongation. Elongations up to several hundred per cent are possible.

Two side clamps also make it possible to stretch the specimen in more than one direction. The recording film is brought up from underneath the specimen until it makes contact. It is then locked into position with slight tension against the rubber to assure a sharp image. Any gap between the specimen and the film emulsion will cause blurring.

This type of X-ray analysis is used to study the effects of variations in dispersion quality. Specimens examined while under strain will often give a better indication of performance than those examined in the relaxed state.

Figure 6 shows a device which has been designed to stretch and to relax specimens repeatedly prior to X-ray examination. The amount of extension can be varied with a series of interchangeable eccentric drive wheels. The rate of extension is controlled by regulating the speed of the motor. This instrument has been spe-

[7] Philips Electronics, Mount Vernon, N. Y.

cifically developed to study flex cracking. The specimens are first X-rayed while relaxed and again periodically as they are subjected to progressive amounts of stress. Changes in temperature and atmospheric conditions can also be introduced as variables.

Electron Microscope Tensile Holder

Through the use of the Wilsdorf tensile specimen holder[8] it is now possible to observe directly the behavior of thin specimens under strain in the electron microscope. This technique was applied recently by Ladd[9] to the study of carbon loaded rubber films.

The Wilsdorf holder is designed for use in a Philips EM-100B electron microscope. Specimens can be stretched to elongations up to about 700%. This stretching can be done manually or hydraulically. With the hydraulic attachment a very slow, constant rate of elongation is possible. Changes in the specimen can be recorded with the standard microscope camera or on motion-picture film, directly off the microscope viewing screen.

As in the special X-ray techniques, microtome rubber sections are employed as test pieces for the Wildsdorf specimen holder. For high resolution these must be cut to a thickness of about 500Å and must also be fairly large in area so that they can be easily mounted. Specially perforated thin sheets of brass or aluminum foil are employed for mounts instead of the usual specimen grids. The section is either positioned over a fine slit or a circular opening. Slippage is prevented by anchoring the rubber with Eastman 910[10] adhesive. The slit type of mount has been most successful for achieving high elongations. Fairly large circular openings have been employed for studying the progress of tears.

Figure 7 shows a natural rubber stock containing a 50 phr. loading of Thermax,[11] before and after a break was induced by the Wilsdorf tensile specimen holder.

Conclusions

Through the use of light microscopy, microradiography or electron microscopy, or through coordinated use of all of these techniques, most problems of pigment dispersion can be resolved. Often a very complete analysis of this type is necessary to explain pigment effects on reinforcement. The effects of varied dispersion quality can be directly observed, using special X-ray and electron microscope tensile specimens. The tensile technique also provides a means of comparing the reinforcing capabilities of different pigments in rubber.

Acknowledgment

Grateful acknowledgment is made to P. Marsh and P. Crawford for their invaluable assistance in the development of the techniques employed in this paper and to M. Puhalski and S. Walsh for their excellent work in preparing the great number of microtome sections that were examined.

[8] Dr. H. G. Wilsdorf, Franklin Institute, Philadelphia, Pa., manufactured by Ladd Research Industries, Burlington, Vt.

[9] Paper presented before the Division of Rubber Chemistry, ACS, New York, N. Y., Sept., 1961.

[10] Cyanoacrylate monomer modified with thickening agent and plasticizer, Eastman Chemical Products Co., Kingsport, Tenn.

[11] Medium thermal carbon black, R. T. Vanderbilt Co., New York, N. Y.

Polyolefins Improve Aging

(Continued from page 79)

TABLE 8. EFFECTS OF LUBRICANT ON AGING*

	Control	Stearic Acid	Polyvinyl Stearate	Benzoic Acid
Days in Air Oven, at 250° F.		Tensile Strength, Psi.		
0	690	725	745	670
1	610	515	535	560
7	565	400	465	530
14	580	405	505	550
21	615	430	535	570
Days in Air Oven, at 250° F.		Elongation, %		
0	725	830	780	730
1	490	615	615	500
7	325	475	375	395
14	290	465	330	355
21	290	480	325	335

* In addition to lubricant, formula includes: Butyl 035, 100 phr.; calcined clay, 108 phr.; zinc oxide, 5 phr.; GMF, 2 phr.; Altax, 4 phr.; red lead, 7.5 phr.

butyl content,[6] one can conclude that the original samples had the same number of crosslinks, and that the number is increased on aging equally with or without polyethylene.

On the other hand, swelling in cyclohexane, which does not extract polyethylene, indicates a decrease in swelling with added polyethylene, even when the swelling is based on butyl content alone. This indicates a restraining influence by polyethylene on the butyl network. Swelling once again decreases on aging to the same degree regardless of polyethylene content.

If the polyethylene were present as aggregates, one would not expect the restraining effect. Rather, the polyethylene particles would be inert, as are clay particles. So there is indirect evidence that a true solution of the two polymers exists, or at least that microcrystalline polyethylene binds rubber the way carbon black does.

Another possibility not excluded is that a two-phase snake cage polymer is present, and that the polyethylene "snake" is so entangled in the butyl "cage" that it restricts the expansion of the cage.

Acknowledgments

The authors thank A. Muenker and D. Sweeney, who carried out many of the tests, the raw material suppliers, and also Rome Cable Co. for permission to publish this work carried out under its sponsorship.

[6] R. L. Zapp, *Ind. Eng. Chem.*, 43, 430 (1951).

Clap-Hands Press Cuts Auto Mats

A NEW type of vertical platen press, in which the die and cutting surface are brought together with a motion similar to hand clapping, is being used by Anchor Industries, Inc., Cleveland, O., to cut automobile floor-mat blanks from a continuous strip of rubber.

The press, designed by May-Fran Mfg. Co., Cleveland, is fed from a wire mesh conveyor directly from the calender. A cutting die is mounted on one platen, and a cutting surface on the other. The platens, each weighing three tons, come together up to 15 times a minute with a drive force of 30,000 pounds. The press was designed to develop 100 pounds of cutting force per inch of cut.

At Anchor Industries a continuous sheet of rubber 60 inches wide is fed directly from the calender on to a wire mesh conveyor 66 inches in width. Thickness of the sheet is anywhere from 0.052- to 0.250-inch, depending on the type of mat to be produced.

Die Sizes

According to Anchor Industries officials, the company uses dies which will cut mat blanks ranging in size from 8 by 14 inches to 59 by 88 inches. For the smaller dies, two or more dies are sometimes mounted together on a platen for multiple cutting. The width of the strip of stock feeding into the press remains unchanged at 60 inches, whatever the size of die.

With slightly different design, the May-Fran press can

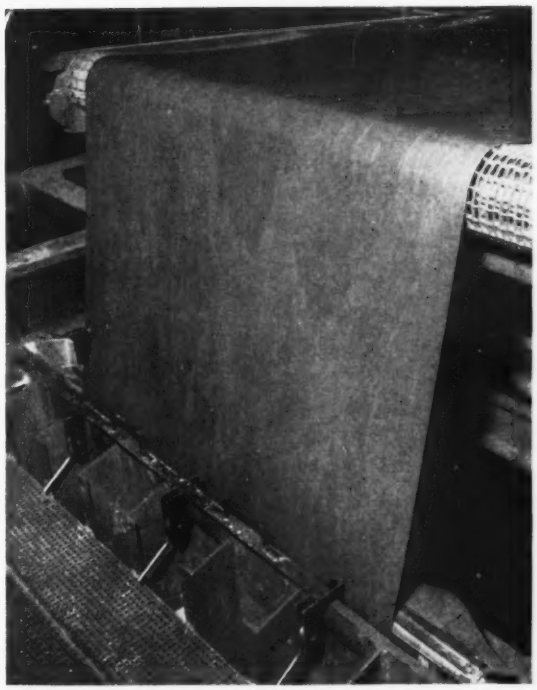


Fig. 1. Rubber sheet, fed directly from the calender, drops off the end of wire mesh conveyor and between press platens

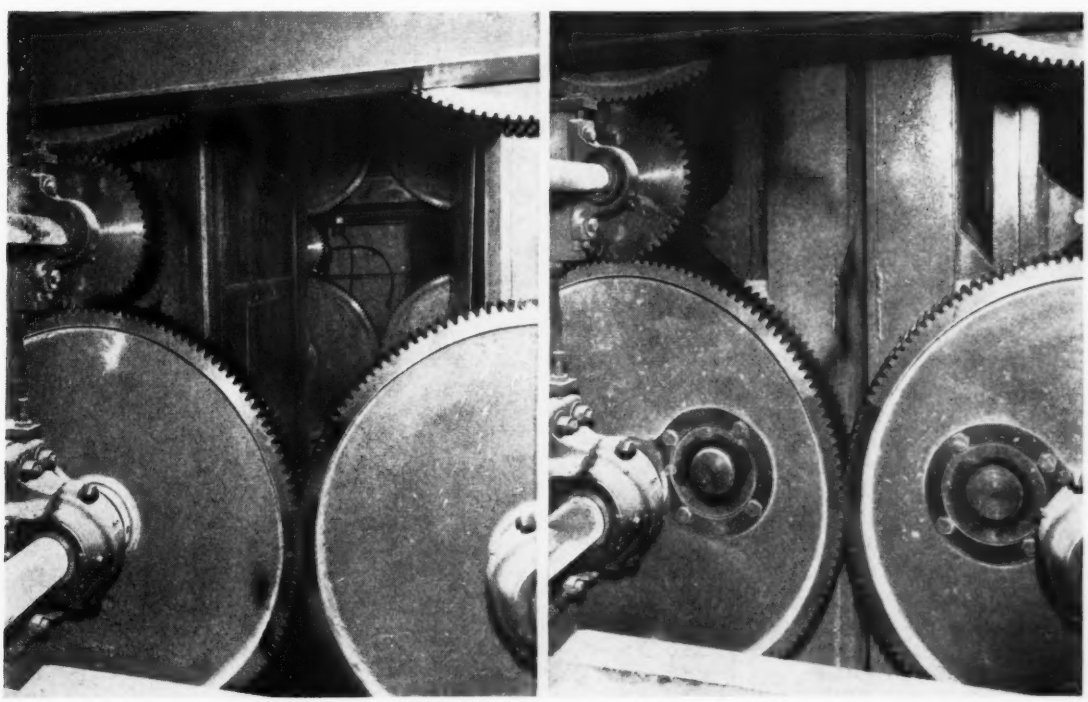


Fig. 2. Two views of giant clap-hands press. *Left*, at beginning of cutting stroke; *right*, at completion of stroke. Bull gears at the bottom of the above illustrations develop a drive force of 30,000 pounds

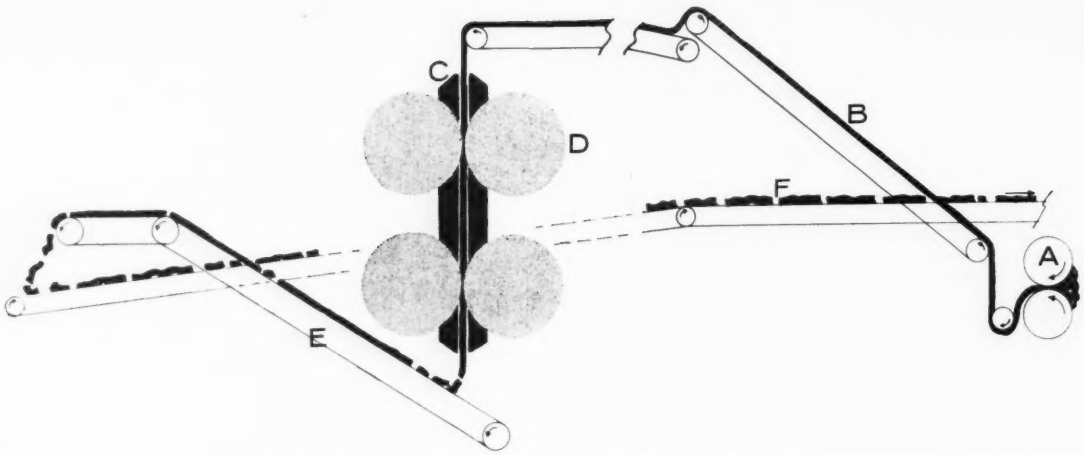


Fig. 3. In operation of clap-hands press, sheet of rubber goes directly from calender (A) to wire mesh conveyor (B) and drops between huge cutting platens (C). Platens are driven by huge bull gears (D). Cut mat blanks and scrap drop on to a rubber belt conveyor (E) and are carried to a platform where blanks are removed and stacked. Scrap drops on to return conveyor (F) and is carried back to calender area

be made to handle dies as large as 92 by 92 inches, or 368 running inches of cut, May-Fran says.

The wire mesh conveyor system, which is 100 feet long, was designed to aid in cooling the sheet as it comes from the calender to within 15 or 20° of room temperature by the time it reaches the press. This is necessary to maintain dimensional stability, insure a clean cut, and guard against residual heat building up, when the mats are stacked, and leading to premature cure. The degree of cooling, of course, will vary with thickness and composition of the rubber sheet.

Feeding Press

The continuous sheet is fed off the end of the wire mesh conveyor system and falls between the vertical platens of the press. Since its weight holds it in the proper position, it does not have to be fed on a track or held in position by any mechanical device.

This is one of the major advantages of this type of vertical press, since it does not require any of the complex feeding devices which may be necessary with a horizontal press used for cutting mat blanks.

When sufficient material has been fed for the proper-size cut to be made, the two platens, one holding the die and the other the cutting board, are brought together. The length of the cutting cycle can be varied by a variable-speed pulley calibrated in feet per minute. The variable-speed control continuously monitors the feet of travel of the overhead wire mesh conveyor system. The controls are set for an amount of feed sufficient for the size blanks to be cut. When sufficient footage has been recorded on the variable-speed control, a cam actuates a limit switch, and the platens are brought together.

Timing Cycle

The timing cycle is preset by the operator each time the die is changed. If necessary, the timing cycle can be altered while the press is running. The cycle can be adjusted for cuts anywhere from three feet to 92 inches.

After the mat blanks are cut, both blanks and scrap drop on to a wide, rubber-belt conveyor, which carries them up above floor level. Two workmen, one standing on either side of the conveyor, remove and stack the cut mat blanks. The remaining rubber scrap drops on to a wire-mesh conveyor and is carried a short distance to another rubber-belt conveyor. This last belt carries the scrap back to the calender area for reuse.

The huge platens are mounted on eight bull gears by means of platen support-shaft assemblies. Each bull gear has a 36-inch pitch diameter and a 4 pitch. The bull gear drive pinion has a 12-inch pitch diameter. The gears are driven by an electric motor through an eddy-current magnetic coupling, and a large number of springs, each 2½ inches in diameter, provides a 20,000 pound pressure cushion that brings the platens smoothly together.

Platen Brakes

In order to cushion the recoil of the platens and brake them quickly while additional strip is fed in for the next cut, two air cylinders are mounted on each platen. Pressure is supplied to the platen counterbalance pistons at 80 psi.

Should the sheet of rubber stock break while the press is in operation, the press will automatically rethread itself without the need of stopping the press. According to May-Fran, the press cannot be damaged if it operates without material between the platens.

Dies used with the press are made of 1¼-inch wide steel rules, mounted on 5/8-inch plywood sheets. The cutting board is backed up with a quarter-inch cushioning material. Dies are changed from a steel platform on top of the press. May-Fran reports that it takes 5-7 minutes to change a die and rethread the conveyor system.

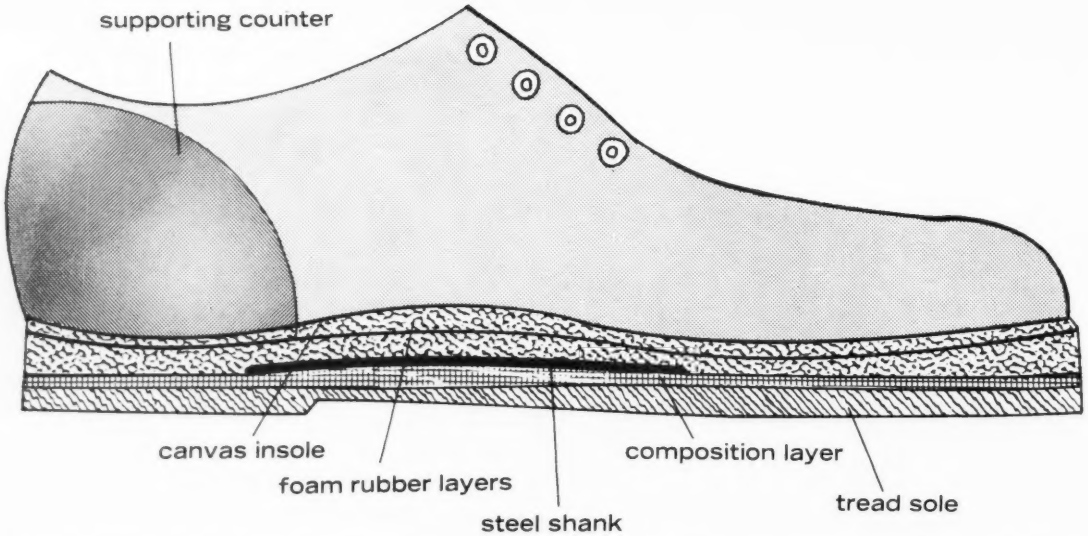
More and more feet are in sneakers these days. The fast-growing popularity of these canvas and rubber shoes for casual wear may be traced to advances in superior sole and heel construction and attractive styles. The recent boom in sneaker sales and production is largely responsible for the increased amount of rubber which has been channeled into the footwear industry during the past few years

Sneakers Are In

PRODUCERS of new rubber can expect a whopping Christmas present for 1962—137 million pairs of sneakers.

This is the sales figure for vulcanized canvas and rubber shoes predicted by the National Association of Shoe Manufacturers for the coming year. The NASM estimates that 125 million pairs of sneakers will be sold in 1961, about 17% of the total pairs of shoes sold, compared with only 8.5% in 1955, when 70 million pairs of sneakers were sold. The sneaker market has expanded far beyond the rather narrow range of strictly athletic wear into everyday casual wear for millions of Americans of all ages.

Lower prices have always been an attractive feature of sneakers, but until recently this economical advantage was not enough incentive to induce buyers to prefer them over a leather shoe for ordinary wear. The persistent worry that the rubber shoe did not provide adequate support for the foot over a sustained period of time and thus might cause or aggravate foot disorders,



The cross-section above shows the construction of Randolph's Randy Pedic shoe, with steel shank and supporting counters. The shoe is made in a variety of styles, colors, and fabrics

has been the major deterrent to sneaker popularity, especially to careful mothers with growing children.

Now, however, one company at least has met this challenge. Randolph Mfg. Co., Randolph, Mass., has developed a sneaker which is made with a steel shank in the sole and with right and left supporting counters around the heel. Called Randy Pedics, the new sneakers are said to give as much support to the foot as many leather shoes (much more support than the built-in foam rubber arch provided in some sneakers) and at the same time allow the complete freedom of movement characteristic of canvas-rubber shoes. Randolph's footwear retail for $3.98, compared to $2.98 for an unreinforced sneaker (although some unreinforced sneakers run as high as $5). A pair of good leather casual shoes, such as oxfords or white bucks, costs about $8.

Dr. Jos. Lelyveld, chairman and founder of the National Foot Health Council, under whose guidance the Randy Pedic was developed, stated that leather moccasins, loafers, and ballerina slippers are more harmful to growing feet than canvas, rubber-soled shoes. Many studies were made among children, and it was found that those who previously complained of foot and leg aches after wearing sneakers were able to wear the models made with steel shanks and supporting counters without experiencing any discomfort.

Lelyveld, speaking for the National Foot Health Council (headquarters in Rockland, Mass.), endorsed the sneakers made with steel shanks as safe for recreational wear and as superior to leather moccasins which give little or no support. These reinforced sneakers, he said, "conform to active feet more freely than stiff leather or stiff synthetic-sole leather shoes. But they should not be worn as a substitute for school shoes." He expressed the hope that all sneakers will be improved with more support, and leather shoes improved with more flexible soles where the foot bends.

To appeal to style-conscious teenage and college girls "sneakers" are now made in all colors, prints, and plaids, and in a variety of fabrics besides canvas—burlap, corduroy, flannel, and even black satin for "after-five wear." The round toe is "out," as everyone knows, and the sneaker maker caters to the times by designing shoes in varying degrees of pointed toes, as well as the newer squared-off toe. One manufacturer makes a very peculiar-looking corduroy shoe with a turned-up pointed toe, which vaguely resembles a Dutch sabot; fortunately, the company does not expect it to be much more than a curiosity.

No one expects the sneaker to replace completely the leather shoe (rubbery spike heels might be a little difficult to engineer, though not at all impossible, we admit), but the market has definitely widened, and sales are cutting into leather shoe sales at a distressing (to the leather shoe man) rate. Sneakers with superior construction, such as the Randy Pedic, can expect a continued rise in sales volume; and comfortable rubber-soled leather-topped shoes are becoming more popular than those with less resilient hard leather or synthetic soles and heels.

All these developments are very encouraging to the rubber people and surely very annoying to the leather people. But it appears that the most obvious area of rubber footwear has been ignored in all the excitement. We speak, of course, of rainwear. Probably because there is virtually no competition in this area from leather footwear (though there is some from plastics), there has been very little innovation in construction or style of waterproof footwear, especially in low-priced models.

Perhaps if the rainwear manufacturers take their cue from the sneaker companies, rubber suppliers will have another Christmas present from the footwear industry in 1963—several more million pairs of rubber boots.

Latex and Color Compounding Are Subjects of SRG Technical Symposia

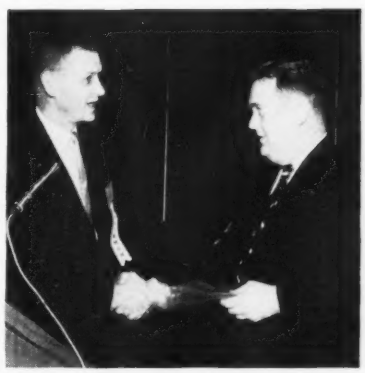
The problems of latex compounding and the use of color in rubber were covered both in general and with regard to specific materials and tests in the two symposia held at the recent Southern Rubber Group meeting in Memphis, Tenn., on November 17 and 18.

The Friday afternoon panel discussed the "Compounding and Use of Latex Materials" and was composed of four speakers. Onslow B. Hager, Alco Oil & Chemical Corp., Philadelphia, Pa., covered the subject in general in his talk "Latex Compounding." One aspect of foam manufacture was the feature of the paper, "Synthetic Latices for Foam," by J. M. Mitchell, Polymer Corp., Ltd., Sarnia, Ont., Canada. A new member of the latex family was described by Kenneth W. Schmit, Shell Chemical Co., Torrance, Calif., in his talk on "Stereo Specific Polymer Emulsions." Another relatively new series of latices, "Carboxylated Latex Compounds," was evaluated by J. P. Davis, Goodyear Tire & Rubber Co., Akron, O. This panel was moderated by Leon Talalay, B. F. Goodrich Sponge Products Division, Shelton, Conn.

The panel on Saturday morning was concerned with "Designing of Colored Rubber Compounds." The moderator for this session was C. M. Butler, Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn. The first panelist, Clyde H. Jones, Rubbermaid, Inc., Wooster, O., talked about "Designing Colored Rubber Compounds" in general terms. The "Techniques for Measuring Color" were described by A. E. Hicks, Petroleum Chemicals, Inc., Lake Charles, La. The specifics of "White Sidewall Compounding" were the subjects of the final talk by Vernon T. Mack, Goodyear.

Latex Technical Session

The general subject of latex compounding including costs, properties, stability, accelerated tests, and equipment was the basis for Dr. Hager's paper. He listed the various places that a latex compounder could obtain information in the literature, but went on to describe some of the problems which make the subject an art as well as a science.



Lenoir Black *(right)* receives a special award for outstanding service to the SRG from Charles M. White

He stated that a latex compound is formulated when motivated by a need. Once the need has been established, and the economic feasibility of making a profit on filling this need has been appraised, the technologist begins to design the compound. The magnitude of this work can be shown by the many factors which must be balanced. The properties of supplies must be considered, the properties of the wet compound, the performance during application of the wet compound, and consumer satisfaction must each be weighed against the other to arrive at a satisfactory material. Each of these four major considerations was further broken down by the speaker into a number of individual problems associated with the particular step such as cost, color, handling, testing, properties, et cetera.

Hager enumerated the various ingredients and their effects which must be included in the design considerations. The complexity of the formula will vary greatly, depending on the number of different types of materials needed.

In discussing cost, the speaker said that the latex technologist can nearly always reduce cost by putting in more filler or replacing certain materials with lower priced substitutes. He suggested, however, that a more rewarding procedure is to consider the entire cost schedule of the latex user's process and fit the best latex compound (maybe higher priced) to it in such a way as to make marked savings in the entire process yet not reduce or compromise good properties.

Hager quoted an example of the manufacture of furniture upholstery fabric wherein the overall cost of the process had been reduced 1¢ per square yard during dyeing by using a higher-cost latex coating. The use of copper-bearing dyes and a copper tolerant compound, while costing 2¢ more to treat a square yard, resulted in savings in the dyeing step of 3¢ for the net 1¢ saving.

The speaker then went on to describe in some detail the various physical properties of latex systems with regard to the effect of handling, processing, and testing on stability, both mechanical and chemical, on viscosity, on rate of drying, and on maturation.

He also dealt in great detail with the performance of such systems during accelerated and in-service tests. Subjects covered included aging in heat, aging on exposure to combustion gases, and the question of to vulcanize or not to vulcanize for such uses as carpet backing.

The final section of this paper concerned itself with equipment for compounding. A discussion of mixers, use of volume or weight to control a process, and the problems of dispersing powders were covered in this section.

Foam from Synthetics

Mr. Mitchell traced the history of the development of rubber foam and the more recent advances in technology which have permitted the use of syn-

The SRG panel on colored compounds included *(seated, left to right)* Clyde H. Jones, Vernon T. Mack, and Arthur E. Hicks. Moderator C. M. Butler stands at right

thetic latices, either alone or in blends with natural latex. He traced the problem of obtaining large latex particles in synthetic latex and described the way modern technology of emulsion polymerization and the development of efficient techniques for coalescing clusters of small latex particles into the desired large particles have made possible the efficient manufacture of high solids, low viscosity SBR and NBR latices for use in foam.

The characteristics of the latices being produced commercially by these modern processes were quite fully described by the speaker.

Polyisoprene Latex

A paper which created considerable interest at the meeting was given by Mr. Schmit. He described the development of a latex form of *cis* 1,4-polyisoprene by Shell in response to many continuing requests from customers.

He stated that a stepped-up program to make such a latex had made available supplies for market development work during the past year and had culminated in the start up of a commercial plant in October.

Since this product has been on the market only a short time and is the only one of its type available, the speaker attempted to cover the subject from the information gained to date along with some of the projected uses or properties which are still under investigation.

He noted particularly that "One thought should be mentioned; although a synthetic *cis* 1,4-polyisoprene latex would be expected to be a major contender for a portion of the natural latex market, other considerations put it in the class of being a completely new product and, therefore, application evaluations should not be restricted by preconceived ideas."

The properties of the material were covered in depth. Mechanical stability falls between that of SBR and natural latices. Chemical stability time is quite short. The solids content, viscosity, average particle size, and particle size distribution were described as being all interdependent.

A major difference between Shell Isoprene Rubber Latex and the natural product lies in the fact that natural latex contains certain materials which act as accelerators. The compounder must allow for this difference in designing his acceleration system. While it gives the compounder greater flexibility in use of curing agents, he must develop different optimum combinations for the synthetic product. Additional studies on accelerator-activator systems and sulfur concentration must still be made, according to Schmit.

Among some of the advantages of Isoprene Latex given for foam manufacture were (1) high hot, wet tensile strength, (2) exceptionally fast, sharp gelation, and also (3) excellent elongation.

Other areas of technology which the speaker predicted might make use of this material included dipped goods, carpeting, and adhesives.

Carboxylic Modified Latices

Mr. Davis reviewed the interesting properties of carboxylic latex systems, using from 0.5% carboxylation to levels in excess of 20%, and described commercial latices containing acrylic or methacrylic acid. Among the advantages claimed for these modified latices are better mechanical or shear stability, improved adhesion, easily attained freeze recoverability, sulfurless vulcanization, and (depending on base polymer) generally improved grease and oil resistance. A possible drawback is the fact that corrosion can be a problem with these carboxylic modified polymers.

The use of zinc oxide and fixed alkali in curing systems was covered by Davis in his talk. Both of these materials have a great effect and should be properly utilized for maximum results. The use of epoxide cure systems was discussed, and the conclusion drawn that such vulcanizates exhibit very good resistance to heat age discoloration.

He emphasized that the uncured properties of these latices are of considerable importance. These polymers have higher tensile values at no increase in modulus when compared with their non-carboxylated counterparts. In applications not requiring a vulcanized compound, the added strength and stability of the carboxylated elastomers make them ideal for difficult service conditions.

The panel on latex compounding at the Southern Rubber Group included: *(left to right, seated)* J. P. Davis, Kenneth W. Schmit, J. M. Mitchell, and O. B. Hager. Moderator Leon Talalay stands behind the panel

Mississippi State Senior Robert F. Ellis *(right)* is awarded the Harmon Connell Memorial Scholarship by J. P. McKenzie

Colored Rubber Compounds

The experiences accumulated over the years by Rubbermaid with its wide variety of colored rubber products for the consumer were collected for presentation to the Group by Mr. Jones. He considered the problems of color use and matching with regard to the many ingredients involved such as elastomer, resins, activators, pigments, fillers, age resisters, curing agents, and colors. The color problems of light fading, migration, resistance to detergents or grease, soap bleeding, and laboratory control testing were listed.

While the speaker went into each point in more or less detail the major points of his talk seem to sum up quite well the proper approach to color compounding.

These points are:

1. In order to make the cleanest, brightest compounds, start with the cleanest, lightest elastomers possible.

2. Select the lightest possible reinforcing resin commensurate with price.

3. Uniformity of color of every ingredient is important when matching to a standard.

4. For clean, crisp colors, the compounder must start with clean, crisp ingredients . . . and keep them clean.

5. Through the use of whiter fillers, less titanium dioxide is required; consequently less color is required.

6. Somewhere between 20 and 30 parts of titanium dioxide on 100 parts of rubber will usually maintain satisfactory color during curing.

7. For sunlight fastness tripling the titanium dioxide and color may be necessary to reduce color changes to make passable stocks.

8. Where only very small amounts of titanium dioxide would be required, zinc oxide reduces the batch-to-batch variation without masterbatching.

9. In order to maintain an exact color match throughout an entire line, use a low-brightness clay for low loadings, an intermediate brightness clay for intermediate loadings, and high brightness clay for high loadings.

10. Select saturated softeners or processing aids to reduce color changes during vulcanization and aging.

11. Certain colors, such as some phthalocyanine blues, will crystallize out of aromatic and naphthenic solvents and plasticizers; their use together should be avoided.

12. Select age resisters which are not photosensitive or which are dark and bloom to the surface.

13. Keep the sulfur content as low as possible while still obtaining the properties desired.

14. Keep critical colors from excessive heat, and increase color concentration if necessary.

15. When quality is paramount, consider premium priced colors in large quantities even if their costs sometimes shock you.

16. Test the use of more color if the color migrates.

17. Chrome plating reduces mold staining and provides a better surface to the finished part.

18. Check your colors for resistance to soap bleeding, detergents, and greases.

The speaker summed up by saying that it is impossible to remove dirtiness which is put into a compound through off-color ingredients. The above guideposts are suggested by Rubbermaid, where "Color is our business."

Measurement of Color

In his discussion on "Techniques for Measuring Color," Mr. Hicks noted that the concepts of color are not simple. To different persons the idea or concept of color differs. The physicist regards color as a phenomenon in the field of optics. The physiologist concerns himself with the mechanism of the human eye and the visual process; the psychologist with the nature of the visual process in terms of the sensations and reactions of a human observer.

While a laboratory technician can "measure the color" of a product, he cannot measure the reaction of the customer to the item as a whole in terms of finite numbers, Hicks said.

The speaker then went on to describe some of the theory involved in color measurement, how this theory is utilized, and some of the various pieces of equipment which can perform such measurements to different extents. He stated that the equipment available varies considerably in price from fairly inexpensive machines to very expensive installations which accounts for the variance in results which may be obtained from them.

White Sidewalls

Mack started off his coverage of the subject, "White Sidewall Compounding," by tracing the erratic early history of white compounds in tires through the changes still being made.

He listed the properties and needs of a compound for white sidewalls and discussed the various polymers and other ingredients for obtaining such a compound. Some of the major points covered included whiteness, staining, dirt pick-up, and cleanability. Tables listing the properties of many rubbers, pigments, and reinforcing agents were presented. The speaker restated the fact, well and painfully known to tire engineers, that field trials are the final step in white sidewall evaluation as well as other tire properties and thus mean long periods of time for full qualification of a compound.

Mack concluded his talk by a crystal-ball look into the future. He noted the recent Goodyear development of combining color along with the white. Tires with red or blue along with white are in production and are available to the public. This use of color as well as styling changes which take advantage of new polymers and new materials lead the author to suggest that there will be plenty of work in the future for the sidewall compounder.

Banquet

The 350 people, members, guests, and wives, present enjoyed a Friday evening banquet in the main ballroom of the Chisca Plaza Motor Hotel, scene of the meeting. In addition to the hospitality room, open both before and after dinner, the Group had several presentations and a guest speaker immediately following dinner. The speaker was Louie E. Throgmorton, vice president & director of public service, Republic National Life Insurance Co., Dallas, Tex. Mr. Throgmorton combined a very witty and amusing talk with his points on the good life in the United States.

G. D. Hutchinson (Armstrong Tire & Rubber) served as master of ceremonies for the session which included presentation of the Harmon Connell Memorial

E. J. Strube *(left)* presenting the SRG Man of the Year Award to Elden H. Ruch

Scholarship Award, the Man of the Year Award, and a special award for outstanding service to the Group to the outgoing president.

Charles M. White (Cabot Corp.), SRG vice chairman, presented a gavel to Lenoir Black for his outstanding service as president of the Group during the past year.

The Man of the Year Award was presented to Elden H. Ruch (Firestone) by last year's recipient E. J. Strube (Du Pont). In his remarks, Mr. Strube noted that most of the winners of this award have been salesmen who are more likely to have the time and the contacts to do an outstanding job, but that Mr. Ruch, who has given a great deal of his time and energy to the success of the Group, has done so from his position in a production unit.

The Harmon Connell Memorial Scholarship award was again presented by J. P. McKenzie (Copolymer Rubber & Chemical Corp.) on behalf of the Group. This year's recipient, the fifth, is Robert F. Ellis, a senior chemistry student. This award, honoring the first president of the Group, is a $500.00 scholarship to an outstanding and deserving senior chemistry or chemical engineering student at Mississippi State University. Mr. Ellis is a credit to the fine group of young men who have received this award.

As the formal meeting was breaking up Saturday noon, a hardy group of members and wives bundled up to face an impending light drizzle while watching the Tennessee-Ole Miss football game, courtesy of the suppliers' hospitality committee.

Kerr Elected Chairman Of Philadelphia Group

Richard M. Kerr, H. K. Porter Co., Thermoid Division, was elected chairman of the Philadelphia Rubber Group, November 3, at the Group's annual fall dance. More than 130 couples attended the affair, held at the Manufacturers Country Club, Oreland, Pa.

Other officers elected were: Henry F. Smith, Naugatuck Chemical, vice chairman; William J. Macomber, United States Rubber Co., secretary-treasurer; James J. Broderick, American Cyanamid Co., and John F. Corr, Vulcanized Rubber & Plastics Corp., directors.

Members who will continue on the executive committee are E. C. Brown, Goodyear Tire & Rubber Co.; K. E. Chester, The C. P. Hall Co.; K. R. Quinn, The Moreland Corp.; V. Van Arkel, R. T. Vanderbilt Co., and R. S. Graff, Du Pont; R. A. Garrett, Armstrong Cork Co., national director; and H. C. Remsberg, Carlisle Tire & Rubber, and R. N. Hendriksen, Phillips Chemical Co., past chairmen.

R. I. Rubber Club Hears Paper on *Cis*-1,4, Poly BR

A report on an easier processing *cis*-polybutadiene was given at the technical session of the dinner-meeting of the Rhode Island Rubber Club on November 2 at the Pawtucket Country Club, Pawtucket, R. I. Attendance totaled 210 at the dinner, after which the following officers were installed: chairman—E. C. Uhlig (U. S. Rubber); vice chairman—J. M. Vitale (Crescent); secretary-treasurer—C. A. Damicone (Acushnet Process); directors—J. M. Donahue (Goodyear), P. Hastings (Kliestone), V. Casey (J. M. Huber), T. Crosby (Muehlstein), and F. Catalfano (Bristol Mfg.).

Z. J. Dorko, Polymer Corp., Ltd., disclosed that the company's new polymer, XPRD-A-329, can be processed without blending with other elastomers. In his talk, titled "*Cis*-1,4, Polybutadiene Its Properties and Applications," he discussed its processing and physical properties and some current non-tire applications.

Easier Processing Illustrated

In a film he showed a comparison of processing behavior between the old conventional polymer, XPRD-A-153, which, when discharged from a laboratory Banbury at approximately 300° F., bagged badly and was difficult to sheet out; whereas the new polymer, XPRD-A-329, readily banded under the same conditions.

Based on Polymer's experience from a number of factory trials on various items the company found the time required to mix polybutadiene compounds in the Banbury was the same as for the natural rubber or SBR controls. It was essential to add all the pigments in the early stages of the mixing cycle to fill the chamber and thus provide sufficient shear for effective incorporation of the ingredients. Polymer found that black compounds behave normally on the sheeter mill, but with some heavily loaded light-colored compounds it was necessary to use tight nips and high friction ratios to prevent the stock from going to the back roll. A rest period between mixing the base and adding the curatives results in improved subsequent processing. In mill mixing it is preferable to use slightly undersize batches and a somewhat tighter nip, and the optimum mixing temperature is approximately 150° F. Like natural rubber, polybutadiene tends to set up on standing so that after having been mixed and rested it may be necessary to break it down on a mill before further processing.

Black reinforced compounds showed a tendency to feed back with a standard extruder, but with wire and cable, where a roller feed extruder was used, no difficulties were encountered. Black compounds had equivalent extrusion rates with the controls, and light-colored stocks had faster extrusion rates than with SBR. On a three-roll factory calender with frictioning ratio of 1:5, suitable temperatures for frictioning black stocks were found to be 221, 203, and 221° F., and for skimming and sheeting, 212, 203, 95° F.

When sheeting out heavily loaded white stocks for tile, it was found necessary to heat the stock to 194° F. and to keep the calender rolls at the same temperature in order to obtain a smooth band. It is desirable to design a polybutadiene compound with a low viscosity as measured at 212° F.

Physical Properties Discussed

Dorko also presented data covering the following properties of *cis*-1,4-polybutadiene: better resilience than natural rubber over a wide range of temperatures; water resistance superior to that of nitrile rubber; aging behavior intermediate between that of natural rubber and of SBR; electrical properties equivalent to those of low-ash grades of cold SBR, with the possible exception of insulation resistance; and very high permeability to inert gases.

The higher resilience of polybutadiene has permitted the size of the solid center of golf balls to be increased, with a corresponding decrease in the amount of winding and a saving in production costs. Polybutadiene-center golf balls are currently being commercially produced. Factory equipment has been used to produce solid tires, floor tile, wire and cable, and V-belts which are currently under test evaulation, and preliminary results show great promise. Results with sponge have not as yet been satisfactory, but development is continuing.

Dorko concluded that these studies of the basic properties of polybutadiene in the laboratory and the encouraging results obtained in the factory trials to date permit one to speculate with a reasonable degree of confidence that the material can be used to advantage in other applications. These would include motor and machine mounts, sandblast mats, high-speed rolls, press pads, printing rolls, hose, heavy-duty hose jackets, pump diaphragms, conveyor belts, etc.

Form Polymer Group

The Polymer Group of Southern California was recently organized as a subject division of the Southern California Local Section of the ACS. The

new group resulted from the efforts of industrial and academic polymer scientists.

Many functions are visualized for the new organization. Among these are encouraging education in polymer science and acting as a clearinghouse for exchange of information between various other groups. Very important will be arranging lectures and discussions in areas not covered by current activities of other societies. Emphasis will be placed upon meetings at which research scientists can present the practical aspects of their work to engineers and technologists, and the latter can indicate to the researchers where answers to basic questions are needed. Other anticipated activities will include social gatherings and dinner-meetings.

Current activities include assistance to Professor Robert Simha in the organization of the University of Southern California Polymer Lecture Series for 1961-62; organization of a two-day Polymer Symposium at the Pacific Southwest Regional Meeting, ACS, in San Diego, December 1 and 2; arranging for a joint ACS-Society of Plastics Engineers meetings and publication of a newsletter.

Participation is open to all who are interested and is not restricted to ACS members. The officers are: chairman—W. C. Teach (U. S. Borax Research Corp.); secretary-treasurer — A. J. Havlik (California Institute of Technology).

Washington Group Installs Officers

The Washington Rubber Group officially opened its 1961-62 season with the inauguration of new officers at a buffet dinner at the Army & Navy Club. Congressman W. H. Ayres, from Ohio's 14th district, was the banquet speaker. The new officers are: president—Thomas A. Tharp (General Tire); vice president—Daniel Pratt (Navy, BuShips); secretary—George T. Wingate (Goodyear); and treasurer—George A. Smith (National Security Agency).

New officers and guest speaker at the Washington Rubber Group meeting are from *left to right:* treasurer—George A. Smith; secretary—George T. Wingate; speaker—Congressman Wm. H. Ayres; and president—Thomas A. Tharp. Vice President Daniel Pratt, not in the picture, was out of town

Quebec Group Marks Twentieth Anniversary

A twentieth anniversary dinner was held in conjunction with the first technical meeting of the season of the Quebec Rubber & Plastics Group on October 19 at Ruby Foo's Restaurant, Montreal, P.Q., Canada. Several past chairmen of the Group were among the 80 members present who heard J. Macht (Polymer Corp.) speak on "*Cis*-1,4-Polybutadiene, Its Properties and Applications."

Macht discussed the physical properties and possible mechanical goods applications of the elastomer. He pointed out that it has a low gum tensile strength so that reinforcing fillers are required to attain optimum properties and that it can be satisfactorily processed. The material shows better resilience than natural rubber and has water resistance superior to that of nitrile rubber. Ozone protection can be achieved with antiozonants. Aging properties are intermediate between natural rubber and SBR. He also noted that the material has a very high permeability to inert gases. Some products to be considered are solid tires, floor tiles, golf balls, wire and cable, sponge, and V-belts.

Recent Developments In The Textile Field

"Recent Chemical Developments in the Textile Field" was the topic discussed by Dr. D. H. Powers at the Elastomer & Plastics Group, Northeastern Section, ACS, meeting held on November 21. More than 100 members and guests were present at the dinner-meeting held in Dedham, Mass.

A special feature was a tour of inspection of the facilities of Fabric Research Laboratories, Inc. Among the items seen was testing equipment utilizing a projectile-type test at speeds of two-thirds the speed of sound which is used to evaluate parachute materials.

In his talk Dr. Powers spoke of the industrial research that produced wash-and-wear fabrics and the processes used. He discussed the advent and advantages of urethane foam as laminations to replace wool in clothing and the ap-

(Continued on page 105)

Present at the Quebec Rubber & Plastics Group twentieth anniversary dinner are *(left to right):* J. L. MacDonald (past chairman); W. R. Blundell (past chairman); J. Macht (guest speaker); E. May (chairman); R. P. Bales (past chairman); E. D. Bent (past chairman); Dr. Nicholls (past chairman); M. F. Anderson (who was the first chairman of the Group after its organization 20 years ago)

washington report

By JOHN F. KING

Malayan Minister Strongly Denounces New GSA Stockpile Disposal Program

The United States Government, after an agonizing process of complicated argument and study among several of its different departments, finally screwed up its nerve to sell on the open market more of its stockpiled natural rubber. The decision, probably one of the most careful and perhaps self-conscious ever to be taken in the field of stockpile policy, produced a tremendous outburst of complaints from rubber-producing countries, hurried and rather pointless explanations from the august Department of State that nobody, really, would be injured, and only a slight effect on the rubber market.

The Malayan Government Minister of Commerce denounced the action in an intemperate outburst in Kuala Lumpur, calling it "economic aggression" that was tantamount to a 50-megaton bomb exploded over the small and underdeveloped countries which depend on primary products for a means of living. Ceylon, which just the week before had told its producers that the future for natural rubber was "not encouraging" and that therefore new plantings should be discouraged, lodged a "strong protest" with Washington, and Indonesia is understood also to have raised general Cain about the new plan.

But after the verbal fall-out from the U. S. Government's alleged 50-megaton explosion, not much, really, seemed to have happened between October 31, the eve of the rubber atom blast and November 15. The market boggled slightly, but seemed to recover immediately. A record of its performance between the time the General Services Administration (GSA) announced the decision (which, incidentally, followed by one day an announcement in Britain that the United Kingdom would dispose of its 25,000-odd tons of stockpile rubber at a rate of about 1,000 tons per month) and November 15 showed that most losses were recovered.

Program Called Small

Commenting on the dramatic display of indignation in Southeast Asia over the GSA announcement, a harried State Department official said with some exasperation that "this is a very, very small sale program, one that in many ways falls short of what a lot of people thought it should be." The last reference apparently reflected the desires of U. S. rubber companies which wanted an even freer disposal program. It also may have been made with the thought in mind that a House investigating subcommittee, headed by Rep. Porter Hardy (Dem., Va.), is scrutinizing the rubber stockpile disposal program with a fishy eye (see RW, Nov., 1961, p. 91).

Here's what caused all the fuss: GSA, November 1, said that beginning immediately it would sell up to 5,000 long tons of stockpile rubber a month at market prices, minus the established 3/8¢ a pound differential. When the market is at 32¢ a pound or over, GSA said, there will be no limit on the sale of nearly 350,000 long tons of stockpile rubber earmarked for disposal as excess to national security needs. This schedule for disposal, termed an "interim" procedure that replaces the old floor-price disposal plan that halted sales when the market fell below 30¢ a pound, would be kept in effect either until 15,000 long tons are disposed of, or until the end of one year, should new procedures not be needed after due study.

If past decisiveness is anything to judge by, it is likely the one-year study period will come and go long before the U.S. Government can again screw up its courage to change the "interim" system. When all the verbiage is stripped away from it, the "interim" plan involves no more than a judgment within the government that 5,000 tons of stockpiled rubber should be sold each month—just to keep pace with the plan to dispose of the 342,447 tons on hand to be sold when the new arrangement was put into effect. Tied to the market, as was the old price schedule that cut off sales when the market paid no more than 30¢, the new schedule will shoot for 5,000 tons a month to avert poor showings such as that in October when only 828 tons were sold by GSA.

Under the British scheme, announced the day before the U. S. stockpile move in apparent impatience that the American Government would ever make up its mind, no limit is placed on sales when the market is above 27 pence per pound. Below that level, British sales will be limited to 1,000 tons a month.

It was interesting to note that when Her Majesty's Government announced the step-up in disposal sales, even though only about 25,000 tons were involved, there was very little in the way of critical comment from the producer countries. It took the GSA announcement a day later to spark the injured outcry.

Malayan Statement Outspoken

Malayan Commerce Minister Johari, in a formal statement issued here by his embassy, said the GSA announcement was designed to "keep the price of natural rubber at an artificially low level which is tantamount to economic subversion of the underdeveloped countries" that depend on rubber and other primary commodities for foreign exchange. The statement said that when Malaya first was advised of the GSA plan on September 25, it urged that when the market was below 28¢ a pound, the U. S. limit its disposal sales to 2,000, not 5,000 tons a month. When this request was ignored, it amounted in the Malayan view to "economic subversion." In comments to the press in Kuala Lumpur, Johari carried this a step further, calling it "aggression" and likening the action to a 50-megaton atom bomb blast aim-

ed at the less developed nations. As far as can be determined here, Johari nor anyone else in the Malayan Government was as outspoken about the British stockpile announcement the day before.

Caught unawares by the wrathful comments from the Far East, the State Department felt called on to reply. Press Chief Lincoln White, while refusing to comment on the Johari statement, prepared and extemporaneous, said the GSA procedure was "decided after prolonged consideration and consultation with governments having substantial interests in the matter. We expect continuing consultations on rubber." White added:

"It has been, and still is, our opinion that the interim procedures (for disposal) are such as to further the mutual and aggregate interests of rubber-producing countries, as well as the United States."

The Ceylonese reaction from Colombo, where the government has decided to cut back rubber planting despite grower opposition, was much more restrained.

It also was a little more even-handed. Unlike Malaya, which also is a neutralist member of the British Commonwealth, Ceylon contented itself with telling the press only that a "strong protest" about the US-UK disposal program had been delivered at the respective foreign ministries in London and Washington.

Perhaps Ceylon can afford to be less concerned since the week before the US-UK disposal announcements it decided as a matter of policy to discourage planting of new rubber land on grounds the future for natural rubber is "not encouraging." Ruling that no new acreage may be devoted to rubber without official approval, the Ceylonese Government ordered arrangements to be made for cultivation of tea, coconut, and coffee on government lands distributed free to peasants on long-term leases. In spite of trade recommendations that Ceylon should concentrate on better yields per acre, as has been done in Malaya, plus new market development efforts, the government ordered the cutback on new plantings. The step-up in rubber disposal announced by the U.S. and Britain increased pressure of Ceylonese growers for a reduction or elimination of Ceylon's export tax on rubber.

Defense Department Revises Patent Policy on Contracts

The Defense Department in October quietly changed its patent policy in a move that is certain to draw heavy fire from business contractors, including those in the rubber industry, who do research and development work for the military and space agencies.

The unannounced policy shift also is expected to strengthen the hand of those in Congress who want to give the government full legal title to all inventions and subsequent patents made by any contractor doing research for federal agencies. The rubber industry has denounced pending legislation that would do just this as a confiscatory measure that would hamper, not help, business and government research and development (see RW, May, 1961, p. 99).

Coincidentally released with the Defense Department's new patent rules was a list of complaints about the government's "give-away" policy in this field made by Adm. Hyman Rickover, the Navy's stormy petrel and father of the nuclear submarine. His testimony, taken behind closed doors June 2 by the Senate subcommittee on patents, trademarks, and copyrights, but only released November 12, was a denunciation of disparate patent policies followed by government agencies which give away valuable rights that actually belong to the taxpayers.

"What disturbs me," Rickover told the Subcommittee back in June, "is not so much the fact—manifestly unjustifiable as it is—that individual companies may make a great deal of money out of inventions developed with public funds, but that this overgenerous policy has an adverse effect on our defense program."

The admiral made clear that his prime target was the Pentagon, and it is certain his arguments were sympathetically received by two of the subcommittee's key members, Sen. John L. McClellan (Dem., Ark.) and Sen. Russell B. Long (Dem., La.), the sponsors of a bill that would (1) give the government full title and exclusive rights to inventions of private contractors to the federal agencies, or (2) set up a new agency to run a tighter, less-generous patent policy.

Policy Matches That of Other Agencies

The introduction of a major change in many of its space research and development contracts by the Defense Department in late October brings its policy into line with that of the Atomic Energy Commission and the National Aeronautics & Space Administration. In general, the latter two agencies' policy has been to turn patents over to private companies, but to retain for the government not only a license to use the inventions, but also the right to license companies other than that of the contractor to use them. The change was made as a result of meetings arranged by Vice President Johnson's Space Council and was made public by the Council's executive director, Edward C. Welsh, in testimony before the Senate subcommittee about the satellite communications system. Until Welsh's disclosure the Defense Department's general policy was to retain only a license for government use of the invention made in the course of private contractor R&D for the military agencies, leaving the contractor free to collect royalties and other commercial rights from non-governmental licensees.

In his testimony, Rickover noted that AEC and NASA are required by law to take full title to patents developed under their contracts. But where the Pentagon is concerned, he said, "The firms who receive grants are a relatively few corporate entities already possessing great concentrated economic power. They are not ailing segments of the economy in need of public aid or subsidy. Nor is there any real reason to offer patent give-aways in order to induce them to accept Defense Department research grants or contracts . . . to claim that agencies cannot get firms to sign such contracts unless patent rights are given away strikes me as fanciful nonsense."

Senator Long, in a recent article in the *American Bar Association Journal*, argues along similar lines. When the government pays a private company to do research for it, the government and not the private company ought to benefit from the results, he stated. To do otherwise would result in even more centralization of economic power because large firms do most of the research and would win an ever-increasing share of the new patents. Senator Long also contends that most private companies require their researchers to turn over invention rights so that when private industry demands rights from the government, it is asserting a "double standard."

Speaking for industry's point of view, Rep. Emilio Q. Daddario (Dem., Conn.) said in a companion piece in the ABA *Journal:* When the government . . . directs a company to turn talent loose on a problem, it is hiring a service. It receives the solution for which it pays; it should not then deny that team or that company the right to use the product of its skill for commercial purposes."

RMA Opposes Legislation

In its presentation to the Senate subcommittee last April, The Rubber Manufacturers Association, Inc., outlining the rubber industry's position on the McClellan-Long bill, set down six reasons why private contractors should have non-governmental rights to in-

ventions discovered in the course of doing R&D for the government:

(1) The government does not need "anything more than a royalty-free license to use inventions" made under government contracts; (2) Enactment of the McClellan-Long bill would strike a major blow at the patent system because it would put increasing numbers of patents in the hands of government where they would not provide incentive to anyone. The constitutional basis of our patent system is to encourage invention. Confiscation of invention by government destroys incentive." (3) The pending legislation solves "a non-existent problem," since business generally sees no need of a policy change that has the government taking patent rights away from originating contractors and distributing them willy-nilly to the rest of the business community. (4) A policy change in the patent set-up would be disruptive of business contracting outside of pure R&D, in supply, for example. (5) Establishment of an overall federal patent agency to handle inventions made under government R&D contracts would be "incongruous," cumbersome, and destructive of private initiative. (6) Because the government, under the McClellan-Long bill, would have the right to license any and all comers for inventions made by a single contractor, companies with long experience in specific fields of research would be discouraged from seeking government R&D contracts.

Union Carbide Must Sell Visking Corp.

Union Carbide Corp. has been ordered by the government to divest itself of Visking Corp., which it acquired in 1956, and restore Visking to its previous position as the nation's largest independent manufacturer of polyethylene film. The order, contained in a 4-1 decision by the Federal Trade Commission, October 29, will permit Union Carbide to retain plants now producing synthetic sausage casings.

The firm's 1956 acquisition of Visking, the FTC majority said, violated the Clayton Act because it tended to create a monopoly in the manufacture and sale of polyethylene film and resins. Union Carbide, the nation's number two chemical company, is the largest producer of the resins used in the manufacture of the film. It also has begun producing polyethylene film at a new facility not connected with Visking operations.

The Commission's decision, written by Chairman Paul Rand Dixon, and the dissent by Commissioner William C. Kern, both dealt largely with the question of whether polyethylene film is a distinct and separate product—a "line of commerce" under the terms of the Clayton Act. The majority said yes, and Kern said no.

Both sides cited the so-called "cellophane case" involved in U. S. vs. Du Pont, in which the Supreme Court held that cellophane as such does not have a separate market distinguishable from that of flexible packagings generally. Kern said that this decision should have been the controlling one in the polyethylene case. But the Commission majority, noting another Supreme Court decision handed down a year after the cellophane case in the Du Pont-General Motors case, cited the High Court's ruling on the existence of a separate market for Duco paints. These paints have "sufficient peculiar characteristics and uses" to be considered as having their own separate market, the court ruled and the FTC majority pointed out.

In addition, the majority said it had carefully weighed another standard regarding the market for polyethylene film—"one which we deem important, but which has received little attention." This factor is the preference of users or buyers for a particular product despite the existence of adequate substitutes.

"Consumers who desire a particular product constitute a separate market for that product," the majority said. "And where, as here (in polyethylene film), that market is substantial it constitutes a line of commerce as those words are used in Section 7 of the Clayton Act."

In making its decision, the Commission majority largely followed the opinion of its hearing examiner in the case, but with one important exception: Union Carbide, after selling Visking, will be allowed to keep its plant built recently at Cartersville, Ga., for synthetic sausage cases. The examiner proposed divestiture of this plant.

M. E. Samuels

Excise Taxes Yield Nearly $300 Million

The Government's Highway Trust Fund netted nearly $300 million from vehicle-user excise taxes paid on tires, tubes, and tread rubber last year, the National Highway Users Conference reports. The fund, which underwrites a large portion of the massive interstate highway construction program, also benefited from other unspecified automotive excises which went into its treasury in whole or in part during the year.

The report of NHUC's research department shows that between 1932 and 1960, taxes on tires, tubes, and tread rubber netted the government over $3.5 billion, about one-tenth of the $38.3 billion raised by all other forms of automotive excise taxes in the same period.

Total automotive excises in 1960 alone yielded $4.5 billion, with gasoline taxes accounting for almost half this amount. The excise tax on automobiles themselves netted more than $1.3 billion; while tires, tubes, and tread rubber came third in order of revenue produced with more than $298 million.

Other automotive excise tax yields in 1960, the report shows, were: trucks, buses, and trailers, $263 million; parts and accessories, $191 million; diesel and special fuels, $82 million; lubricating oil, $79 million; and motor vehicle-use tax, $45 million.

NHUC's report shows that motor vehicle taxes paid by five top states amounted to almost one-third of the 1960 automotive excise tax yield. They were California, $428 million; New York, $325 million; Texas, $269 million; Ohio, $250 million; and Pennsylvania, $248 million.

■

Samuels Joins RW Editorial Board

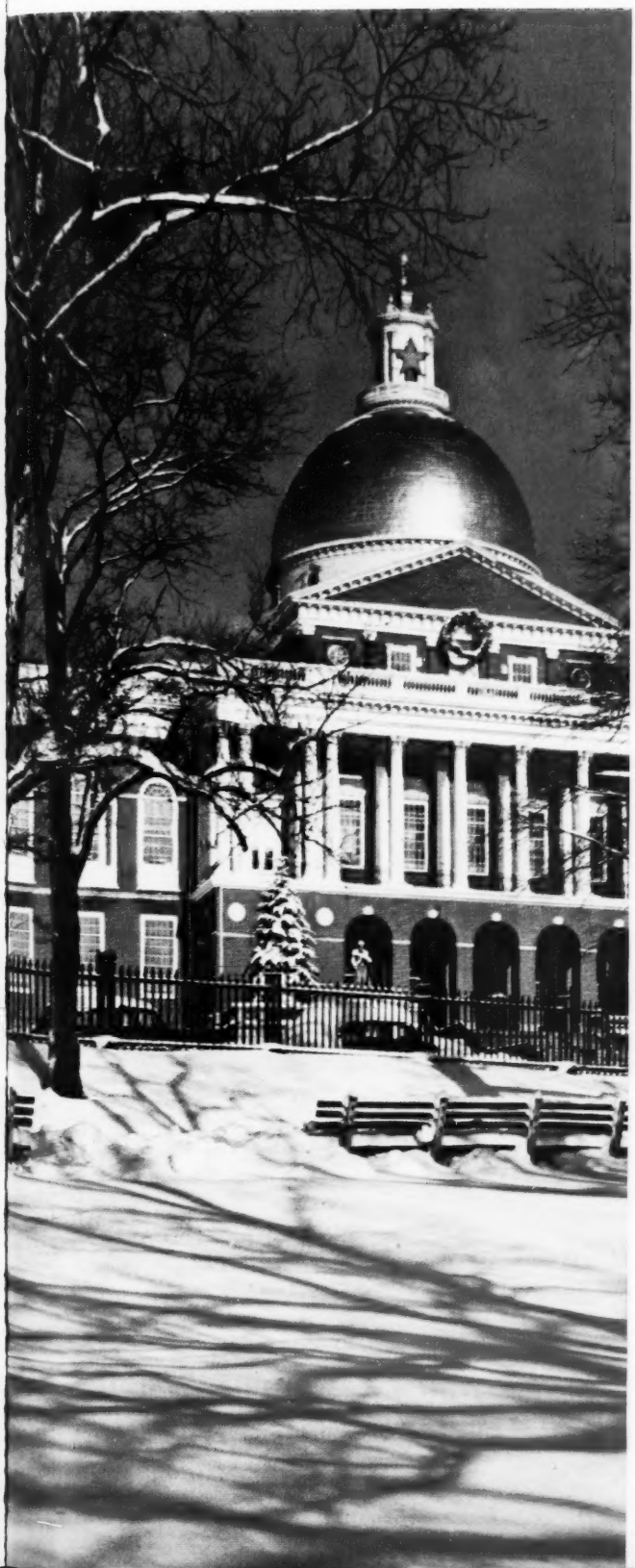
Martin E. Samuels, product quality manager of Copolymer Rubber & Chemical Corp., Baton Rouge, La., has been appointed to the editorial advisory staff of RUBBER WORLD.

Samuels has had more than 20 years' experience and background in the synthetic rubber industry. After receiving his B.Ch.E. from the University of Dayton in 1939, he was employed in the foam rubber division of Dayton Mfg. Co. In 1943 he joined Copolymer as a chemist and supervisor, was named development manager in 1957, and recently became product quality manager.

During his 18 years with the company Samuels has distinguished himself by participating in the commercialization of "cold rubber" and helping develop and produce commercially the first practical high solids concen-

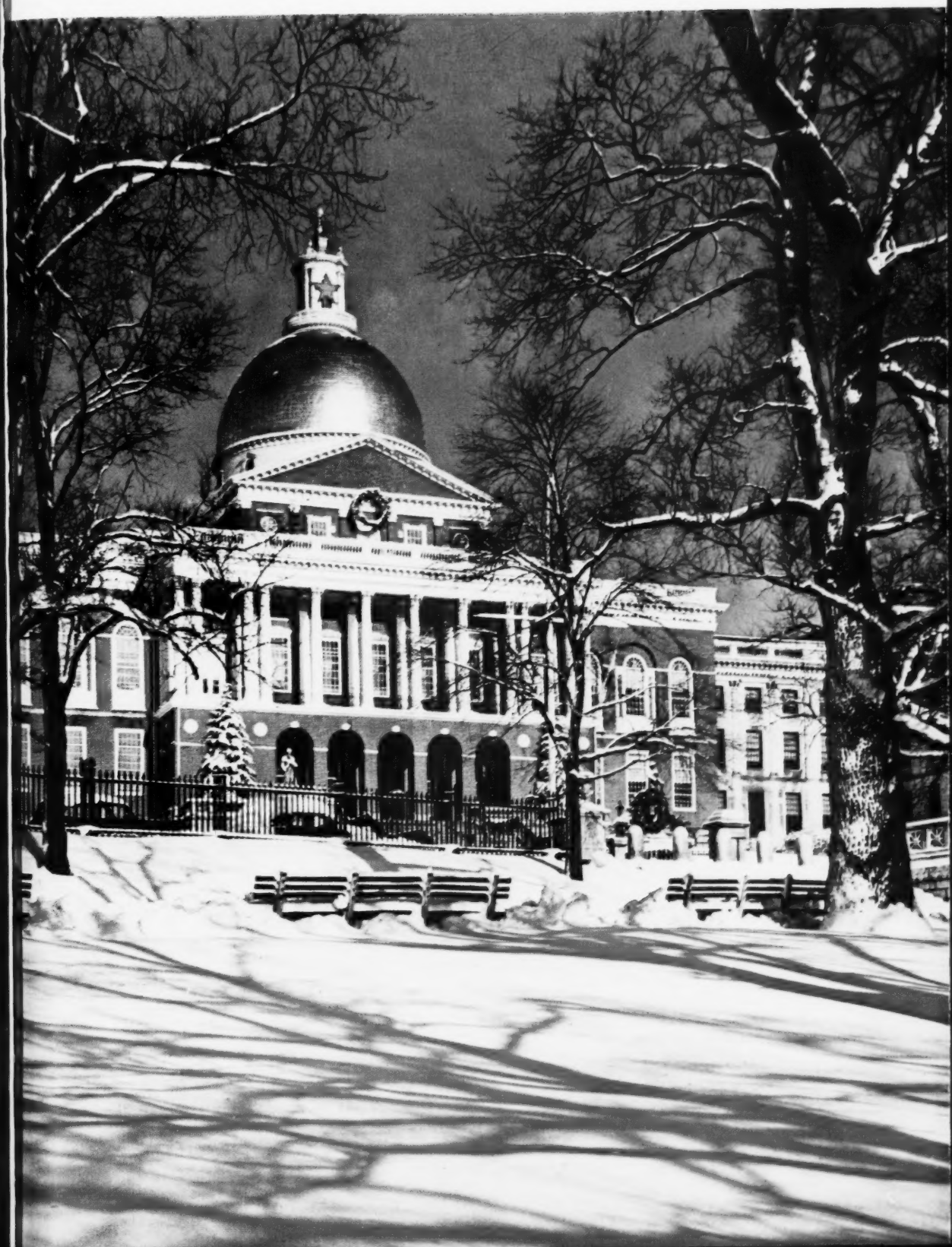
(*Continued on page 105*)

HOLIDAY GREETINGS AROUND THE WORLD



CABOT CORPORATION

BOSTON 10, MASSACHUSETTS



Christmas on Beacon Hill, Boston

The snow lies hushed and still.
Even the golden dome of the State House,
designed by the celebrated Mr. Bulfinch,
seems to reflect a special quiet glow
of serenity and joy.
It is the Christmas season.
May the abiding spirit of this season
reside in you and yours
throughout the coming year,
and bring you happiness.

CABOT CORPORATION

125 HIGH STREET, BOSTON 10, MASSACHUSETTS, U.S.A.
LIberty 2-7300 Cable: CABLAK BOSTON

BRANCH OFFICES

AKRON 8, OHIO — 518 Ohio Building — FRanklin 6-5168

CHICAGO 4, ILLINOIS — 141 West Jackson Boulevard — WEbster 9-6480

DALLAS 1, TEXAS — 1712 Commerce Street — RIverside 1-6117

LOS ANGELES 5, CALIFORNIA — 3350 Wilshire Boulevard — DUnkirk 2-7333

NEW BRUNSWICK, NEW JERSEY — 46 Bayard Street — KIlmer 5-1828

NEW YORK 17, NEW YORK — 60 East 42d Street — YUkon 6-7127

SUBSIDIARIES

ARGENTINA — **Cabot Argentina S.A.**, Sarmiento 930, Buenos Aires

CANADA — **Cabot Carbon of Canada, Ltd.**, 121 Richmond Street West, Toronto 1, Ontario

ENGLAND — **Cabot Carbon Limited**, 62 Brompton Road, London, S. W. 3

FRANCE — **Cabot France S.A.**, 45, rue de Courcelles, Paris 8

ITALY — **Cabot Italiana S.p.A.**, Via Larga 19, Milano

AUSTRALIA — **Australian Carbon Black Pty. Limited**, Millers Road, Altona, Victoria (jointly owned)

Printed in U.S.A. December, 1961

Good 1962 and Excellent Future Growth Predicted at RMA Meeting

R. T. Compton

The signs and portents for the rubber industry for the future to 1975 point "to a splendid period of growth and development in any case, and to a spectacular one if the elements in the industry show the initiating power required to meet the challenge, and, in so doing, grasp the opportunity that lies before them."

Thus did T. G. MacGowan, director of advance planning for the Firestone Tire & Rubber Co., sum up his address before the forty-sixth annual meeting of The Rubber Manufacturers Association, Inc., in New York, November 16.

Mr. MacGowan shared the morning session with Dr. R. T. "Ted" Compton, vice president for government relations of the National Association of Manufacturers, who gave a report on the first session of the 87th Congress. The meeting, held in the Essex House, also featured Dr. Gabriel Hauge, vice chairman of the board of directors of Manufacturers Hanover Trust Co. Dr. Hauge's luncheon address was titled, "Our Economic System and the National Character." Nearly 200 of the rubber industry's top executive talent were present for the business meeting and program.

Sees 1962 Near Record

In his opening remarks the presiding officer, Ross R. Ormsby, RMA president, predicted a year second only to record-setting 1959 for the coming year as measured by consumption of rubber. The estimates are that the industry will use 1,615,000 long tons of rubber next year, a figure close to the 1,628,000 long tons used in 1959. Synthetic rubber will creep closer to supplying three-fourths of this total.

Mr. Ormsby pointed out that the development and use of synthetic rubber has given the industry a degree of supply and cost stability never experienced in the past. He drew special attention to the increasing use of the new stereo regular rubbers, pointing out that four plants are now in commercial production, and that a fifth would come on stream within a few days.

Mr. Ormsby took special note of improved stability also in labor management relations in 1961, observing that:

"This year many of our companies have combined wages and contract issues in a single set of negotiations, with these matters settled for a longer period of time than previously was the case. Also," he added "this year the Union has for the first time given recognition to a wage differential between tire and non-tire products. This we believe to be most constructive and again adds stability to our operations, providing the rubber industry with an opportunity to do a better job of forward planning."

He also noted the many times during the year when the RMA filed statements or appeared on behalf of the industry on legislative matters. Acknowledging that there are occasions like these where it is appropriate for a trade association to express an industry view, Mr. Ormsby said that it is proper and more effective for individuals "in our industry to express their own views on legislation, and we strongly urge that more of this be done."

Economy in Congress Predicted

Greater sentiment for more economy in Washington is expected to manifest itself in the second session of the 87th Congress, according to Dr. Compton.

He expressed the view that more cautious attitudes could be expected to prevail in the next session of Congress with respect to rising costs of government, and that there would be widening opposition in the House to

R. R. Ormsby

Shown at one portion of the head table at the RMA annual meeting luncheon are: *(left to right)* J. H. Hoffman (Mansfield Tire & Rubber), Pierce Sperry (Sperry Rubber & Plastics), A. L. Freedlander (Dayco Corp.), A. H. Weschler (Converse Rubber Co.), Arthur Kelly (B. F. Goodrich), M. G. O'Neil (General), T. G. MacGowan (Firestone), Russell DeYoung (Goodyear), Harvey S. Firestone, Jr., (Firestone), H. E. Humphreys, Jr. (U. S. Rubber), and Gabriel Hauge (Manufacturers Hanover Trust)

financing the government programs by borrowing through the process known as "back door" financing, as contrasted with normal appropriations procedures.

Compton said that in an election year when every member of the House must make an accounting to his constituents, members of that body may be giving more weight to opinions back home and less to Congressional leadership.

For that reason, he said, "We seem to be coming into a time when the outcome of the major issues may depend just a little less on the attitudes of Congressional leadership and a little more on the opinions that you and others express to your Congressman about these issues."

Speaking only a matter of hours after the death of House Speaker Sam Rayburn, Dr. Compton departed from his prepared text to announce the fact, unknown at the time to many in the audience, and to pay respect to "Mr. Sam." He noted that no matter who became the next speaker, the smooth working arrangements that Rayburn had would be broken and that the new House leadership would require time to get anywhere near a comparable arrangement. In the meantime there will undoubtedly be changes and realined relations.

Faster Growth Rate Seen

The steady postwar growth of the rubber industry will continue at an even faster rate through 1975 as companies diversify production toward non-rubber products and rubber products other than tires, Mr. MacGowan predicted.

Since 1946, the industry has been growing along with the total economy in a healthy, if not spectacular fashion, he said. Although it is not usually ranked among the industrial groups thought to have the best growth possibilities, the rubber industry has nevertheless nearly doubled its sales since the war.

Just how good is the future of the rubber industry likely to be? Depending on the degree of creative and innovational power shown by the industry, MacGowan looks for a sales increase of between 130 and 156% by 1975. Such rates of growth would be far greater than those expected for the American economy as a whole or for the country's manufacturing industry in general.

"The tire and tube business will, as it has always been, continue to be a very good one," MacGowan declared. Encouraging trends for the future are the increasing number of automobiles in relation to the population, the popularity of snow and other special-purpose tires, and increased use of the automobile with more leisure time available.

The encouraging fact, MacGowan went on, is that 23.2% of the industry's sales in 1960 were in the rapidly enlarging field of non-rubber products, an area in which its growth rate has far outstripped the country's overall growth in manufactured goods. The non-rubber areas of the industry include chemicals, plastics, fibers, metal products, defense items, and numerous miscellaneous lines.

The rubber industry's development and marketing of new lines and new products within old lines is "one of the hallmarks of industrial growth that is more rapid than for manufacturing industry in general," the speaker said.

Many of the industry's best possibilities in the diversification line stem from the use of entirely new materials which will basically change the character of the product and widen its field of application.

Entirely new polymers, including numerous rubber-plastic blends, have a great future, according to the Firestone executive.

"An industry which can build into the polymers it uses any desired combination of strength, weather resistance, heat and cold resistance, oil resistance, hardness and softness is in an excellent position to withstand competitive attack from substitute materials and to move into fields now dominated by other materials."

He also listed rubbers of the polybutadiene, polyisoprene, ethylene-propylene, nitrile, acrylic, and "Hypalon" types as important materials which can potentially change the character of the industry.

Although transportation will continue to be the industry's greatest field, MacGowan looks for accelerated moves into other areas with "a splendid period of growth and development in any case" and "a spectacular one" if the industry's opportunities are fully seized.

The building and construction industry offers perhaps the greatest untapped market for the rubber industry, he feels.

"There are many improvements that can be made in building materials and many ways in which the rubber industry can and will be involved profitably and usefully in these changes."

Maritime products, the aircraft industry, wearing apparel, the leisure activities market, adhesives, and components for machinery all offer splendid future growth possibilities for the

Other sections of the head table included *(left to right)* R. C. Firestone (Firestone), Thomas Robins, Jr. (Hewitt-Robins), F. B. Williamson, III (Goodall Rubber), J. H. Matthews (Raybestos-Manhattan), and T. W. Miller, Jr. (Faultless Rubber). Also *(inset)* J. P. Seiberling (Seiberling Rubber), L. R. Jackson (Firestone), J. W. Keener (B. F. Goodrich), G. R. Vila (U. S. Rubber), and R. T. Compton (NAM)

rubber industry.

MacGowan pointed out that even without further diversification the sales of the rubber industry as a whole to automotive producers amount to only about one-sixth of its total volume. He contrasted this situation with the greater element of dependence on automotive purchases found in such industries as upholstery leather, malleable iron, lead, zinc, steel, and nickel.

He also cited the rubber industry's trend toward increase in manufacturing plants abroad as a key to diversified growth.

"There seems little doubt that the rubber industry has gone further in this matter of foreign plants than has almost any other, and the number of such plants is continuing to increase."

At the same time, the value of tires being exported from the United States is still more than four times as large as the value of imported tires. The ratio of exports to imports in the case of the American tire industry, MacGowan said, is one of the highest for any industrial group.

Directors Reelected

Six industry executives were reelected to serve three-year terms on the RMA board of directors during the business meeting. They were: A. L. Freedlander, chairman of the board, Dayco Corp., Dayton, O.; T. W. Miller, Jr., president, Faultless Rubber Co., Ashland, O.; M. G. O'Neil, president, The General Tire & Rubber Co., Akron, O.; F. B. Williamson, III, president, Goodall Rubber Co., Trenton, N. J., J. W. Keener, president, The B. F. Goodrich Co., Akron; and Russell DeYoung, president, The Goodyear Tire & Rubber Co., Akron.

Goodrich Acquires Vanderbilt Outlets

The B. F. Goodrich Co., Akron, O., has acquired from Vanderbilt Tire & Rubber Corp., New York, N. Y., its 37 leased automotive outlets operating in department stores throughout the United States. Most departments are located in Metropolitan New York, Los Angeles, San Francisco, and Chicago, and include Macy's, Bamberger's, Wieboldt's, and The May Co.

Future operations of these leased automotive departments will be conducted by a B. F. Goodrich subsidiary to be known as Vanderbilt Automotive Centers, Inc. B. F. Goodrich will also acquire Vanderbilt's interest in F. F. Automotive Stores, Inc., a corporation jointly owned with Food Fair Stores, Inc.

Marbon Builds Its Own Styrene Plant

Marbon Chemical Division of Borg-Warner Corp., Washington, W. Va., will be producing its own styrene monomer by the middle of 1963. By then the company hopes to have completed a 75-million-pound-a-year plant next to the Baytown, Tex., refinery of Humble Oil & Refining Co., which will supply Marbon with ethylbenzene. Enjay Chemical Co. will sell the feedstock to Marbon via pipeline.

Marbon will use the styrene it makes to manufacture "Cycolac" acrylonitrile-butadiene-styrene copolymers in its plant at Washington, W. Va. The company also makes high-styrene reinforcing resins at Gary, Ind.

It looks to industry observers as if Marbon, in addition to removing itself as a buyer, will contribute to the already troublesome situation of a market headed toward overcapacity. Last year potential was about two billion pounds, and output about 1.7 billion. This year, output has dropped to 1.119 billion pounds for the first eight months (compared with 1.184 billion pounds in the first eight months of 1960). By late 1962, total U. S. styrene capacity will be 2.340 billion pounds, and in 1963, when Marbon's unit comes on stream, it will be 2.415 billion pounds.

Great American Adds Linear as Subsidiary

Great American Industries, Inc., New York, N. Y., recently acquired a new subsidiary, Linear, Inc., whose main rubber plant is in Dallas, Pa., with research and development laboratories in Philadelphia. Linear does a volume business of between $5 and $6 million in specialized molded rubber packings, catering particularly to the automobile, aircraft, electronic, missiles, rocket, and space industries, and also to manufacturers of farm machinery.

James G. Groendyk, head of rubber operations for Great American, will be president of the new Linear Corp. Other rubber companies owned and operated by Great American are: Rubatex, Bedford, Va.; Lorraine Rubber Co., Maywood, N. J.; and Great American Electronics Corp., Bedford, a recent development specializing in the manufacture of rubber for all types of shock-absorbing equipment.

Research, Development Facilities Centralized

The General Tire & Rubber Co., Akron, O., has moved its scientists, researchers, and engineers into its new research and development center in Springfield Twp., O., in a move to coordinate its chemical research and product development activities. The $2,200,000 U-shaped building houses laboratories for both central research and central development, an area containing offices, library, drafting rooms, conference rooms, and a cafeteria. About 500 items of testing and research equipment have been installed in the new building.

C. M. Bolster, who is the coordinator of the company-wide research and development activities of The General Tire & Rubber Co., will be responsible for the work carried out at the new center.

Schatzel Honored At Testimonial

R. A. "Rudy" Schatzel was honored at a testimonial dinner held at the Biltmore Hotel, New York, N. Y., on November 15 in recognition of his impending retirement at the end of the year after 37 years of service to the wire and cable industry.

Dr. Schatzel started his career with Rome Cable Corp. (now Rome Cable Division of Alcoa) and was assistant research director in the 1920's. He switched to General Cable Corp. in 1926 where he served as director of research until rejoining Rome Cable as vice president and director of engineering in 1945. He has held this position for the past 16 years.

In January, 1950, Schatzel joined the Editorial Advisory Board of RUBBER WORLD to advise the editors on wire and cable subjects and served until 1956. He was very active in many associations, but has been particularly associated with the American Society for Testing and Materials. He has been a faithful member of this Society's Committee D-11 on Rubber and Rubber-Like materials and, in 1956, was elected president of ASTM.

During World War II he was very active on the War Production Board and in 1945 was made a member of the U. S. Technical Intelligence Committee which investigated German research in synthetic rubber.

"Rudy" has written many technical papers, holds numerous patents, and has contributed to various textbooks in his field. His memberships over the years have included the American Chemical Society, Fellow of the American Institute of Chemists, American Institute of Electrical Engineers, American Society for Metals, American Association for the Advancement of Science, American Institute of Mining & Metallurgical Engineers, Society of Naval Engineers, British Institute of Metals, British Institute of the Rubber Industry, and Insulated Power Cable Engineers Association.

© Bachrach, 1949

R. A. Schatzel

Polymer Corp. To Build BR Plant

Polymer Corp., Ltd., Sarnia, Ont., Canada, has initiated construction of a 20,000-ton polybutadiene plant in Sarnia. This is the fourth major Polymer project started in Sarnia this year. The others are: facilities for the production of black masterbatch; a new butadiene extraction unit; and a new marketing building.

The Hon. Raymond O'Hurley, Minister of Defence Production, who presided at the ground-breaking ceremonies, emphasized the importance of this plant to Sarnia and to Canada by adding to the flow of product to Canadian and export markets.

GE Sets Prices for Electrical Systems

Published prices on basic standard systems for industrial process machinery have been released by General Electric, Schenectady, N. Y. Handbook sheets have been issued covering basic systems for the rubber, metal rolling, paper, printing, mining, and cement industries.

The system handbook sheets include a statement of the basic application and equipment; a description of the principal functions of the overall integrated system; a listing of components, services, and prices. The information contained takes into account not only individual components of the system, but also clearly identifies engineering and service contributions. The publication has been designed to provide the customer with either a priced solution for his problem or a basis for the evaluation of alternative solutions.

Aerial view of General's new research and development center

Committee D-11 Assigns Three SBR Numbers

Committee D-11 on Rubber and Rubber-Like Materials of the American Society for Testing and Materials, through Subcommittee XIII on Synthetic Elastomers, has assigned numbers to one cold SBR and two oil and black extended SBR polymers. Number 1512 was issued at the request of Phillips Chemical Co., Akron, O.; number 1818, Copolymer Rubber & Chemical Corp., Baton Rouge, La.; and number 1819, United Carbon Co., Inc., New York.

DESCRIPTION OF TYPES OF STYRENE-BUTADIENE (SBR) ELASTOMERS, ASSIGNMENT OF NEW CODE NUMBERS—ASTM D-11 1419-56T

Number as Assigned	1512	1818	1819
Date assigned	10/12/61	10/2/61	10/17/61
Requested by	Phillips Chemical Co.	Copolymer Rubber & Chemical Corp.	United Carbon Co., Inc.
Distinctive feature	29% bound styrene	ISAF black	Aromatic oil
Close previous number	6630	3765	1809
Type	1500	1800	1800
Nominal temperature, ° F.	41	43	43
Activator	—	FRA	FRA
Shortstop	ND	ND	ND
Antioxidant	NST	ST	ST
Catalyst	OHP	OHP	OHP
Emulsifier	FA	Mixed	Mixed
Nominal bound styrene, %	29	23.5	23.5
Conversion, %	60	60	60
Mooney Viscosity ML 1+4 (212° F.), polymer	52	—	—
Compound	73 max.	60	60
Coagulation	GA	Acid	Acid
Carbon black type	—	ISAF	HAF
Phr.	—	75	75
Oil type	—	HI-AR	AR
Phr.	—	37.5	37.5
Finishing	Special	Normal	Normal

Note: Abbreviations and symbols are defined as follows:

AR = aromatic
FA = fatty acid
FRA = free radical type, i.e., iron-pyrophosphate, peroxamine sulfoxylate
GA = glue acid
HAF = high abrasion furnace
HI-AR = highly aromatic
ISAF = intermediate super abrasion furnace
ND = non-discoloring
NST = non-staining
OHP = organic hydroperoxide
ST = staining

Stock Synthetic Rubber Masterbatches Offered

A new line of 15 Banbury-mixed synthetic rubber masterbatches based on neoprene, hycar, butyl, and "Hypalon" with carbon black and oil or non-black pigments and oil is now available from Burton Processing, Inc., Burton, O. The carbon blacks used are MT, EPC, SRF, and HAF. When compounded with recommended curing agents, these premixes can meet a variety of automotive ASTM specifications, or they can be blended to meet other requirements.

The 15 premixes include seven neoprene, four Hycar, two butyl, and two "Hypalon" in specified hardness and tensile ranges. The company guarantees the durometer and tensile specifications when the masterbatch is tested in Burton's test recipes. The price range for these masterbatches is from 19.0¢ to 41.5¢ per pound f.o.b. Burton, O.

The company is exclusively engaged in custom mixing and offers these and other stock masterbatches to those without mixing facilities or to others faced with production interruptions. Burton maintains inventories of 350 compounding materials for customer service. It also has two separately housed No. 9 Farrel-Birmingham Banbury internal mixers, one for black, and the other exclusively for light stocks to insure color uniformity. The company also maintains a quality-control laboratory and offers technical assistance to those seeking a solution to their manufacturing problems.

Seiberling Marks Fortieth Anniversary

Seiberling Rubber Co., founded in Akron in 1921, celebrated its fortieth anniversary on November 21. Established by the brothers F. A. and C. W. Seiberling, the company has grown to a $50-million-a-year business, with 2,500 employes in plants in the United States and Canada. Today J. Penfield Seiberling, son of F. A. Seiberling, is chairman of the board, and H. P. Schrank is president.

Seiberling produces all types of passenger and truck tires, plastics, shoe products, auto and truck floor mats.

Pennsalt Markets High-Performance Resin

A new commercial method for manufacturing tetrafluoroethylene is being patented by Pennsalt Chemicals Corp., Philadelphia, Pa.

Tetrafluoroethylene is a gas which, when polymerized, becomes an extremely high-performance resin. This plastic, Pennsalt's TFE Fluorocarbon Resin, is resistant to high temperature, chemical attack, and all types of solvents, the company states. The material is presently used in chemical process and electrical equipment, and mechanical components susceptible to wear.

This will be Pennsalt's second entry into the fluoropolymer field in the past 20 months; the first was "Kynar" vinylidene fluoride, introduced in March, 1960.

Samuels on Board

(*Continued from page 96*)

trated synthetic latex for the manufacture of foam rubber. He also helped develop and produce a superior carbon black masterbatch, without the use of a chemical dispersing agent.

Samuels is a member of the American Chemical Society and a past treasurer of the Southern Rubber Group. He lives in Baton Rouge with his family.

Recent Developments

(*Continued from page 93*)

plication of polyethylene powder to the back of car rugs as a shaping means for fitting purposes.

Other topics discussed were: high-temperature yarns, including HT-L and the interfacial polymerization process by which it is formed; reactive dyestuffs; permanent creases in wool; "curly" Orlon, which is extruded as a double layer; "burnt" Orlon, of cyclic structure; and Spandex polyurethane yarn.

Tlargi Meeting

The Los Angeles Rubber Group, Inc., held a dinner-meeting, November 7, at the Biltmore Hotel, Los Angeles, Calif., which was attended by 268 people. At the technical meeting, which 85 attended, P. F. Bertsch (Du Pont) addressed the Group on "The Construction and Use of Contour Graphs for Analyzing Data" (see RW, June 1961, p. 75). The after-dinner speaker was Fred Haney, general manager of the Los Angeles Angels, who related some of the problems and situations in connection with piloting a major-league ball club.

news briefs

SINCLAIR-KOPPERS CHEMICAL CO. styrene plant, newest addition to the Houston, Tex., expanding petrochemical complex, has attained its capacity operating rate of 70 million pounds of styrene yearly, less than six weeks after start of production. The plant, one of the world's largest producers of styrene using gasoline fractions as the raw material, is a joint venture between Sinclair Oil Corp., New York, N. Y., and Koppers Co., Inc., Pittsburgh, Pa.

U. S. PEROXYGEN CORP., Richmond, Calif., manufacturer of organic peroxides, has completed expansion of facilities which double its capacity to produce tertiary butyl peroxide, a widely used polymerization catalyst.

BEATRICE STEEL TANK MFG. CO., INC., and TOTE SYSTEM, INC., have been consolidated into a single company, Tote Systems Division, Hoover Ball & Bearing Co., Ann Arbor, Mich. The new company will continue to manufacture the complete lines of the two predecessor companies and maintain present dealer and distributor affiliations.

BEEBE RUBBER CO., Nashua, N. H., has broken ground for a new 12,500-square-foot addition to its main plant. The building, seventh addition to the Beebe plant in the past eight years, will be used principally for warehousing Ripple Soles.

UNITED STATES RUBBER CO., New York, N. Y., is constructing a $1-million distribution center for consumer goods on the outskirts of Atlanta, Ga. The center will serve the Atlanta sales district and also five other southeast sales areas: Charlotte, Memphis, New Orleans, Jacksonville, and Miami.

THE PRESRAY CORP., Pawling, N. Y., subsidiary of Pawling Rubber Corp., has opened a 15,000-square-foot plant at Palo Alto, Calif., to manufacture pneumatic devices for delicate lifting, rotating, transporting, and holding operations of critical materials. The plant is located to serve such firms as Lockheed Aircraft, Philco, Aerojet-General, and United Technology.

GENERAL ELECTRIC CO., silicone products department, Waterford, N. Y., has gone on stream with a $1-million process plant for the production of new types of intermediate silicone chemicals. The facility is part of a current $5-million expansion program in new plant and equipment started at the Waterford location in April, 1960.

CABOT CORP., Boston, Mass., has entered into an agreement with Fabriques de Produits Chimiques de Thann et de Mulhouse (F.P.C.), whereby Cabot will enjoy the exclusive rights in the United States to F.P.C. patents and methods relating to the production of pigment-grade titanium dioxide through the flame chloride process.

The B. F. Goodrich Co., Akron, O., has completed a tire capable of handling the heat, loads, and speed of the 2,000-mile-an-hour B-70 jet. To simulate heat conditions generated by air friction during flight, Goodrich subjected the tire to temperatures of 360° F. (above; so hot it will boil water), then simulated a "landing" of the tire while it was still hot.

AMERACE CORP., New York, N. Y., has begun construction of a $750,000 plant in Linesville, Ala., to manufacture semi-pneumatic tires, which are supplied to producers of lawn mowers, toys, and bicycles. The new plant will be operated by Swan Rubber Co., Carey, O., one of Amerace's eight divisions. Scheduled to begin operations in March, 1962, it is the eighth facility constructed in the last eight years by the divisions comprising Amerace.

TEXAS-U.S. CHEMICAL CO., New York, N. Y., has completed a new *cis*-polybutadiene pilot plant at Port Neches, Tex. Texas-U.S. is jointly owned by Texaco, Inc., and United States Rubber Co., both of New York.

PRENTISS WIRE MILLS, Riverside-Alloy Metal Division, H. K. Porter Co., Inc., Riverside, N. J., has installed new equipment at its Holyoke, Mass., plant. The added facilities, now being used in production runs, provide increased production capacity for hose reinforcing wire.

RIPPLE SOLE CORP., Detroit, Mich., has been granted a new patent by the Government of New Zealand, the fourth patent granted to the company by that country. The patent covers the Ripple Sole construction in combination with a wedge sole. The patent has been assigned to Ripple Sole Corp. by the inventors, Nathan, Morton, and Leonard Hack, all of whom are officials of the corporation.

THE BARR RUBBER PRODUCTS CO., Sandusky, O., has succeeded in maintaining its suit challenging the validity of the Molitor patent of Sun Rubber Co., Barberton, O., according to a decision of the New York Federal Court. Barr's suit charges invalidity of the Sun patent (which covers a method for forming toys and other hollow articles of vinyl plastisol), violation of the antitrust laws, and abuse of the patent in licensing arrangements. An earlier decision on the same case dismissed Barr's suit by quashing service of the summons and complaint. The new decision, made in accordance with a remand of the Court of Appeals, is based on depositions and exhibits filed in the case.

news about people

J. S. Hanse

R. V. Thomas

J. S. Hanse, trade sales manager, has been promoted to general manager, replacement tire sales, for The General Tire & Rubber Co., Akron, O. He will be responsible for sales in both the United States and Canada. **Morgan J. Morgan** succeeds Hanse as trade sales manager, and **Gordon Lichtwardt** will fill Morgan's former position as San Francisco district sales manager.

Richard V. Thomas has been elected president of Goodyear International Corp. and also a director of the parent Goodyear Tire & Rubber Co., Akron, O. He succeeds **Frank T. Magennis,** who recently retired as president and director after 44 years with Goodyear.

James P. Drury and **Forrest H. Kelley** have been promoted to superintendent of tire production and manager of factory scheduling, respectively, in the production division of Seiberling Rubber Co., Akron, O.

John Yacos, Jr., has been elected vice president, general manager, and a director of The Wilson Rubber Co., Canton, O., a wholly owned subsidiary of Becton, Dickinson & Co., Rutherford, N. J.

Allan J. Costantin has been named a technical representative in the Midwest region of Union Carbide Plastics Co., New York, N. Y. He will locate in the district sales office in Dallas, Tex.

Leo Roth has been named general manager of Dayton Rubber Co. (Canada), Ltd., Toronto, Ont., a subsidiary of Dayco Corp., Dayton, O.

R. J. Jones

L. K. McKeivier

Richard J. Jones has been named a technical sales representative for the industrial chemicals division of Pennsalt Chemicals Corp., Philadelphia, Pa. He will headquarter in the company's Akron, O., sales office.

Phillip E. McIntyre, manager of rubber chemicals development in Akron, O., for Monsanto Chemical Co., St. Louis, Mo., has been promoted to the post of product director for rubber chemicals. He succeeds **Chester W. Christensen,** who retired November 30 after 39 years of service to the company.

J. R. Lakin has been elected vice president, marketing, of the B. F. Goodrich Tire Co., division of The B. F. Goodrich Co., Akron, O. **Roger W. Strassburg** has been named manager, research operations, at the company's research center in Brecksville, O., succeeding **Charles H. Stockman,** who recently became vice president and general manager of Goodrich-High Voltage Astronautics, Inc., Burlington, Mass. Replacing Strassburg as manager of the BFG general chemical laboratories in Akron is **James P. Parker.**

L. K. McKeivier has been named sales manager of the export division of Seiberling Rubber Co., Akron, O.

David J. Mann has been appointed director of research of the reaction motors division, Denville, N. J., of Thiokol Chemical Corp., Trenton, N. J. **Murray S. Cohen** succeeds Mann as manager of the chemistry department. Other appointments at the plant are: **Donald D. Perry,** supervisor, synthetic research section; **Marvin M. Fein,** supervisor, applied chemical research section; **Michael Israel,** supervisor, research operations and plans section.

Philip E. Robinson was elected executive vice president of Tyrex, Inc., association of Tyrex rayon tire cord producers, New York, N. Y. **George I. Rounds** was appointed vice president. **Frederick Bissinger,** vice president of Midland-Ross Corp., will serve as president and chairman of the board, and **Philip B. Stull,** president of American Enka Corp., will become vice chairman of the board.

Thomas F. Jacoby has been appointed assistant technical director at Alco Oil & Chemical Corp., Philadelphia, Pa.

Raymond E. Klavuhn has been promoted to vice president of manufacturing at McCreary Tire & Rubber Co., Indiana, Pa. He will continue supervision of the manufacturing and technical divisions of the company and will remain controller.

Marcus J. Graham has been appointed manager of the Mojave, Calif., carbon black plant of United Carbon Co., New York, N. Y.

R. W. Strassburg

J. R. Lakin

M. J. Graham

R. E. Klavuhn

news about people

W. L. Rutherford J. F. Whiting

William L. Rutherford has been assigned as sales representative in the newly established chemicals division sales office in Dallas, Tex., of Eastman Chemical Products, Inc., subsidiary of Eastman Kodak Co., New York, N. Y.

M. E. Dole has been named general manager of Tote Systems Division, Hoover Ball & Bearing Co., Ann Arbor, Mich. **J. E. Brashears,** former general manager of Hoover's ball division, will be assistant general manager.

B. V. Hettich has been named manager of the newly formed Urethanes Project by FMC Corp., New York, N. Y.

Clarence E. Thornley has joined the industrial chemicals sales department of Commercial Solvents Corp., New York, N. Y. He will headquarter at the company's western sales district office in Agnew, Calif.

James E. Williamson has been appointed laboratory manager of Beebe Rubber Co., Nashua, N. H.

Thomas E. Farrell has been appointed marketing manager for the rubber products division of Dayco Corp., Dayton, O. He succeeds **J. A. Conlon,** recently named vice president of Dayco's rubber products division.

Herbert J. Peterson and **Edward G. Deibert** have been appointed to the technical service staff of Oakite Products, Inc., New York, N. Y. Peterson will be located in Chicago, Ill., and Deibert has been assigned to Allentown, Pa.

Milton M. Marisic has been named manager of the research and development department at Liquid Carbonic Division of General Dynamics Corp., New York, N. Y.

Robert C. Hyatt has been promoted to general manager of the Antara Chemicals Division of General Aniline & Film Corp., New York, N. Y.

James F. Whiting has joined the sales division, Cleveland office, of The Baker Castor Oil Co., Bayonne, N. J. He will service the rubber, plastics, paint, and related chemical industries in the Ohio, western Pennsylvania, and eastern Michigan areas.

N. J. McCracken will assume the new post of manager, polybutadiene department, for Polymer Corp., Ltd., Sarnia, Ont., Canada. **D. E. McLellan,** acting manager of the technical division since 1960, takes over as manager of the division. **G. W. Ames** succeeds McLellan as technical superintendent of the rubber department. **K. B. Jensen** was promoted to chief instrument engineer.

Arthur M. York has been appointed director of public relations for United States Rubber Co., New York, N. Y.

Pach Bros. N.Y.

Pach Bros. N.Y.

A. M. York D. E. McDowell

David E. McDowell has been appointed manager of retread and repair materials of the U. S. tires division, United States Rubber Co., New York, N. Y.

Richard Buchanan has been made chemical and pigment buyer in the purchasing department of The Gates Rubber Co., Denver, Colo. He replaces **Jack Liedike,** who has been promoted into the company's factory management training progr

Fred H. Weber has been promoted to product manager of the industrial sales division, The Faultless Rubber Co., Ashland, O. **Leo F. Woefling** has been named product manager of the newly established foam division; while **George Treida** was appointed product manager of the company's plastics division.

William C. McBrien has been made a technical representative in the New York area for Admex vinyl plasticizers, a product of Archer-Daniels-Midland Co., Minneapolis, Minn.

H. W. Holly has been appointed product manager for urethane elastomers for American Cyanamid Co., New York, N. Y. Holly will work at the company's rubber chemicals department at Bound Brook, N. J.

A. J. Buselli has joined Texas Butadiene & Chemical Corp., New York, N. Y., as vice president, research and development.

James E. Kilgallon has been appointed district sales manager of the New York branch, mechanical goods division, United States Rubber Co., New York, N. Y. He will headquarter in Passaic, N. J.

John W. Slaton has been named market development manager of the Urethanes Project, newly formed by FMC Corp., New York, N. Y.

John L. Layne has been named industrial sales representative covering eastern Pennsylvania, southern New Jersey, Delaware, Maryland, and Washington, D. C., for The Faultless Rubber Co., Ashland, O.

Joseph C. Hofmann, Jr., has been appointed manager of retread and repair materials for The Goodyear Tire & Rubber Co., Akron, O.

J. W. Keener, president of The B. F. Goodrich Co., received a decoration of The Order of The Star of Africa, with the rank of Grand Band, from William V. S. Tubman, president of Liberia. In making the presentation at Blair House, Washington, D. C., President Tubman said, "This honor is conferred in recognition of your substantial contributions, and those of your company, to industrial progress in the Free World, and particularly in Liberia." Goodrich was granted a concession of about 600,000 acres of land in 1954 by the Liberian Government and now has about 11,000 acres under rubber cultivation.

L. P. Thies has been made manager of the rubber chemicals department in the chemical division of The Goodyear Tire & Rubber Co., Akron, O. He will continue as manager of the polyester products department. New product managers in this department also appointed are: **P. A. Koons,** emulsion polymers; **J. Planter,** stereo rubbers; and **J. F. Carraher,** rubber chemicals.

H. W. Holly L. P. Thies

MORE GOOD NEWS ABOUT
SYNPOL
...IN COATING AND FLOORING
TEXUS

Used for a wide variety of coated fabrics, SYNPOL gives this sleeping bag softness and flexibility, protects against soil and moisture, insulates against cold weather.

Lightweight and capacious describes modern VAL-A-PAK® luggage of SYNPOL-backed nylon fabric for smart and lasting protection of clothing against dirt, dust and inclement weather. SYNPOL gives just the degree of flexibility required, provides a durable, non-staining interior surface to make this luggage so highly practical.

All coated fabrics described processed by **Aldan Rubber Co.**, Philadelphia.

The rugged, warm DUXBAK® hunting coat is lightweight, yet highly waterproof and windproof. A SYNPOL rubber resin lines and bloodproofs this jacket's expanding game pocket. SYNPOL guards against moisture, is permanently flexible.

New, fast pastel colors is the powerful sales secret of American Rubber Sales Company's line of marbleized and flecked terrazzo pattern rubber floor tile. SYNPOL offers such remarkable color characteristics that users can now enjoy all the resilience, durability, and economy for which rubber tile is outstanding, with truly superior color effects.

TEXUS

SYNPOL®

Consider the "good news" possibilities SYNPOL SBR Rubbers offer your product... present or proposed. Choose from the widest line of SBRs in the industry. Enjoy the product and processing advantages resulting from unusually rigorous quality controls. Discover the difference a SYNPOL can make.

Among the 30 SYNPOLS that can save you money and boost your product performance in these and other applications are:

SYNPOL	HOT TYPES			COLD	OIL-EXTENDED
	1001	8000	1061	1502	8209
DESCRIPTION					
Emulsifier	Fatty Acid	Fatty Acid	Fatty Acid	Mixed Acid	Mixed Acid
Stabilizer	Slightly Staining	Non-Staining Non-Discoloring	Non-Staining Non-Discoloring	Non-Staining Non-Discoloring	Non-Staining Non-Discoloring
Coagulant	Salt Acid	Salt Acid	Salt Acid	Salt Acid	Alum
Polymer					Polymer—100 pts.
Oil					NAPH—25 pts.
PROPERTIES					
CHEMICAL	**Specifications**	**Specifications**	**Specifications**	**Specifications**	**Tentative Specifications**
Volatile Matter % wt.	0.50 (Max.)	0.75 (Max.)	0.50 (Max.)	0.75 (Max.)	0.75 (Max.)
Ash % wt.	1.50 (Max.)	1.50 (Max.)	1.50 (Max.)	1.50 (Max.)	1.25 (Max.)
Organic Acid % wt.	4.00—6.25	4.00—6.00	4.00—6.50	4.75—7.00	4.50—6.30
Soap % wt.	0.75 (Max.)	0.50 (Max.)	0.75 (Max.)	0.50 (Max.)	0.10 (Max.)
Bound Styrene % wt.	22.5—24.5	42.0—45.0	22.5—24.5	22.5—24.5	33.5—36.5
Stabilizer % wt.	1.00—1.75	1.25 added	1.25 added	1.25 added	1.25 added†
PHYSICAL	**Specifications**	**Specifications**	**Specifications**	**Specifications**	**Typical Production Values**
Specific Gravity	0.935	0.965	0.935	0.935	0.950
Raw Viscosity, ML-4′—212° F.	44—52	40—50	44—52	46—58	50
Cpd. Viscosity, ML-4′—212° F.	73 (Max.)	65 (Max.)	73 (Max.)	73 (Max.)	46
Tensile psi 50′	2500 (Min.)	2500 (Min.)	2500 (Min.)	3100 (Min.)	3620
Elongation % 50′	500 (Min.)	550 (Min.)	500 (Min.)	575 (Min.)	650
Modulus psi 25′)	325—625	300—700	325—625	350—650	510
Modulus psi 50′ ›300% Elongation	750—1100	775—1175	750—1100	700—1150	1090
Modulus psi 100′)	1200—1600	1400—1900	1200—1600	1150—1650	1210
Water Soluble Ash % wt.					
Water Absorption mg./sq. cm.					
TEST RECIPES[1]					
Polymer or Masterbatch	100.00	100.00	100.00	100.00	100.00
EPC Black	40.00	40.00	40.00	40.00	40.00
Zinc Oxide	5.00	5.00	5.00	5.00	5.00
Sulfur	2.00	2.00	2.00	2.00	2.00
Benzothiazyldisulfide	1.75	1.75	1.75	2.00	2.75
Stearic Acid					1.50
REMARKS	General purpose hot rubber which is more resistant to staining and discoloring than 1000.	A very light-colored, high styrene (43.5 parts) polymer. Non-staining and non-discoloring. A modification of 1013.	A non-staining non-discoloring polymer stabilized for maximum resistance to breakdown and gel formation during milling.	Non-discoloring and non-staining cold rubber. Higher physicals than 1006 and 1061.	An oil-extended cold polymer offering excellent physical properties, light color, good processability and economy.
APPLICATIONS	Tires, molded and extruded mechanical goods, shoe soles & heels.	Calendered goods, closures, can sealants, adhesives and molded goods. Designed for applications requiring high green strength and excellent flow characteristics.	Light-colored & white products such as white sidewall tires, shoe soles, floor tile, toys, hospital sheeting, sporting goods, high-impact styrene.	Light-colored & white products such as white sidewalls, light mechanicals, floor tile, hospital sheeting, toys, soles, heels, food conveyor belts, high-impact styrene.	Floor tile, shoe soles and heels, cable jacketing, battery boxes, steering wheels, household goods, bowling balls, coated fabrics.

[1]The figures given are parts by weight of NBS Standard Compounding Ingredients. Press cure at 292° F.

TEXUS *Pace setter in synthetic rubber technology*

TEXAS-U.S. CHEMICAL COMPANY
9 Rockefeller Plaza, New York 20, N. Y.
JUdson 6-5220

NEW ENGLAND DISTRICT
1644 Massachusetts Ave.
Lexington 73, Massachusetts
VOlunteer 2-8550

CENTRAL DISTRICT
140 N. LaGrange Road
LaGrange, Illinois
FLeetwood 4-6640

SOUTHERN DISTRICT
2472 Bolsover Drive
Houston 5, Texas
JAckson 3-3132

OHIO VALLEY DISTRICT
112 Market Street
(P. O. Box 202)
Orrville, Ohio
MUrray 2-4891

ATLANTIC DISTRICT
237 Lancaster Avenue
Devon, Pennsylvania
MUrray 8-7764

WEST COAST SALES AGENT
The C. P. Hall Co. of California
444 Alaska Avenue
Torrance, California
SPruce 5-6666

Common Market Entry Expected to Stimulate British Rubber Industry

Great Britain's proposed membership in the European Common Market will probably do more good than harm to her rubber industry, *Rubber and Plastics Weekly* predicts. The main advantages of the move, the British journal feels, are that Great Britain will have access to the rapidly growing markets in the Common Market countries (France, Italy, Belgium, West Germany, The Netherlands, and Luxembourg) and at the same time be able to meet European competition on an equal basis, as she will be inside the Market's tariff wall.

Here is the situation as *Rubber and Plastics Weekly* sees it.

Suppliers Face Competition

Whether or not Britain enters the Common Market, prices of natural and synthetic rubber will probably continue to drop because the growing number of synthetic plants is creating an increasing overcapacity of production facilities in Europe. Total synthetic rubber production capacity in the Free World minus the United States is estimated at 794,000 long tons in 1961; consumption for this year will be 800,000 long tons, including imports from the United States. Production capacity of synthetics in 1963 is estimated at 1,287,000 long tons; while consumption (including U. S. imports) will be only 1,040,000 tons, according to *Rubber and Plastics Age*, October issue.

This means that in the Free World excluding the United States there will be a capacity surplus of almost 250,000 tons in 1963; more than half the production facilities will be centered in the Common Market countries. About two-thirds of these facilities will be producing SBR rubbers.

The SBR market is particularly burdened with an excess of production capacity, with new plants in Italy, The Netherlands, and elsewhere which have capacities far in excess of present or even projected demand.

Competition for butyl will be keen, also, when the Esso plant at Fawley, England, goes on stream in 1963, to compete with SOCABU in France, and a projected Polymer Corp. plant. These plants will have a total capacity of between 70,000 and 80,000 tons yearly, a sufficient amount to satisfy the needs of the Common Market countries. Canadian exports of butyl to Europe will probably suffer when companies within the Common Market are able to produce sufficient quantities, but as Polymer Corp., the only Canadian producer of butyl, will have a plant somewhere in Europe by that time, the situation should not be too troublesome.

As yet, there is no common external tariff proposed on synthetic rubber, but the possibility of tariffs or import quotas still remains. Great Britain now levies a 10% tariff on synthetic rubbers, but this is minimal protection at best, and its disappearance should not make much difference to British producers.

As far as natural rubber is concerned, entry into the Market will make little difference either to the cost or availability of the material. Natural rubber already enters nearly every European country free of duty, and, as with synthetics, no common external tariff is proposed by the Market. The long-term outlook for natural rubber will be determined by factors which would have developed with or without the Common Market—increased competition from synthetic rubber, and the consequent need of establishing lower, more competitive prices. The European countries will most likely remain the largest market for natural rubber suppliers.

Outlook for Consumer Goods

Rubber product manufacturers in Great Britain may have a rougher time at first than the suppliers, when they are faced with tariff-free, direct competition with the European nations. There is presently a 30% tariff on tires entering the United Kingdom, which will have to be dropped when she joins the Common Market. Other European nations also impose heavy tariffs on tires, however, and as all these tariffs will be eliminated gradually, the international trade situation should not change radically.

Owing to the differing size and construction requirements from country to country, the tire trade is primarily not an international business. Tire manufacturers have preferred to set up branch plants in the foreign countries, rather than export to the market. It seems likely that this pattern will persist even after the elimination of the tariff barriers. The opportunity to trade within the Common Market should actually boost British tire production and sales, as the automotive industry and therefore the demand for replacement tires are gaining much more rapidly on the Continent now than in Great Britain.

The British footwear industry will be faced with great competition from the more advanced European manufacturers. Sales to England of better designed, more cheaply produced shoes from the Continent will certainly be stimulated by removal of the tariff barrier.

Production costs for other rubber goods differ very little from England to the Continent. In hose, belting, and general rubber goods, Germany is Great Britain's strongest competitor, but the latter has been meeting competition very effectively so far and should be able to maintain her position.

Continent's Industry Growing

Great Britain has the third largest rubber manufacturing industry in the world, after the United States and Russia, consuming 291,000 tons of rubber in 1960. West Germany, which has the second largest rubber industry in Europe, used 250,000 tons of rubber last year.

Although Britain is still the largest single consumer in Europe, the rate of increase in consumption has been much more rapid in some of the other Common Market countries. Between 1950 and 1960, France doubled her consumption rate, and Germany's use increased threefold. British consumption of raw rubber increased less than 25% in the ten-year period. The six members of the Common Market together consumed 638,000 tons of rubber last year, more than twice as much as Great Britain.

If trends continue to follow their present pattern, the British rubber industry will not much longer be the largest single rubber producer in Europe, and, in effect, no longer is, if the Common Market nations are regarded as a single economic unit. As long as Great Britain is outside the Common Market, she must regard the group as a single competitor and quite a formidable one. Since most of the problems which the British rubber industry has to face

upon joining the Market are those arising from conditions of overcapacity and greater competitiveness which exist with or without the Common Market, it appears that the British rubber industry will, on the whole, be much better off if the country can compete with the Six on an equal basis as a member of the group, even at the sacrifice of her protective tariffs.

Bateman Predicts Research Breakthrough

Leslie Bateman, director of research for the Natural Rubber Producers' Research Association, reports that the "first clues to the chemical mechanism (of the rubber tree) have recently been discovered and these open the way to further biological and chemical findings that could profoundly influence the production industry.

As of today, control of rubber production in the tree is wholly genetic. Present research, based on microscopic examination of the latex molecule, is geared to discovering just what makes one tree produce more rubber than another, even under similar genetic and environmental conditions. NRB research teams hope eventually to control the output of a tree in much the same way that one controls the output of a factory.

Rubber Exchange Set for Malaya

The Malayan Rubber Exchange is to start operating in Kuala Lumpur early in 1962, according to a recent announcement by the Federation Government. The exchange is to be incorporated by an act of Parliament, and its rules and contract conditions will be enforceable by law.

The government said that it is in general agreement with the recommendations of the rubber exchange drafting committee, which include: that the principal trading contract of the exchange should be an f.o.b. contract, parallel to and interchangeable with the f.o.b. contract of the Singapore Chamber of Commerce Rubber Association (SCCRA); that the exchange and the SCCRA should establish by-laws to provide for joint clearing and settlement; a common panel of arbitrators; and common standards of policies on discipline.

Statutory incorporation was recommended because it will establish special rights and obligations on members which can be enforced by the courts. This condition has been especially welcomed by the Singapore market, because the SCCRA cannot enforce its trade rules.

The drafting committee pointed out in its report that the most serious defect of the Singapore market is the "doubt which exists regarding the financial stability and position of the Singapore guarantee brokers." Losses by such brokers are known to have been incurred through failure of customers to whom unwarranted credit has been given, through defaults by speculators, and also through speculations by the brokers themselves (which is against the SCCRA rules).

The committee considered that the trading rules of the SCCRA form an acceptable basis for the by-laws of the exchange, but recommended certain improvements. One is the requirement that a broker intending to conduct a guarantee business through the exchange should maintain a continuing security with the exchange of at least $500,000 (Straits currency), and in the case of Singapore brokers, at least $750,000.

Firestone Ventures Into Uruguay

The Firestone Tire & Rubber Co., Akron, O., and Fabrica Uruguay de Neumaticos Sociedad Anonima (FUNSA) in Montevideo, Uruguay, have signed a technical assistance agreement for the manufacture of tires and varied rubber products.

The South American company will continue to build tires under the FUNSA name as well as manufacture Firestone tires. It is the largest industrial concern in Uruguay, currently employing about 2,500 workers and has been in operation since 1936.

Firestone will also open its own distribution outlet in Montevideo to sell tires and other products manufactured for it by FUNSA.

Australian Growth in Chemicals, Plastics

Australia can now produce ethylene, butadiene, and styrene as a result of the completion last August of the two petrochemical complexes at Silverwater, New South Wales, and Altona, Victoria. After certain modifications have been introduced, they will be able to recover propylene, butylene, isoprene, benzene, and cyclopentadiene. The Altona establishment is understood to have an annual capacity of 45,000 tons of ethylene and 20,000 tons of butadiene.

Available capacity of petrochemicals is now far in excess of demand, but consumers, noting the spectacular rise in consumption of petrochemicals in the United States between 1940 and 1960, are optimistic.

Australia already produces a wide range of plastics: polystyrene (Monsanto and CSRC-Dow); polyethylene (ICIANZ and Union Carbide Australia); PVC (ICIANZ and B. F. Goodrich-CSR Chemicals); cellulose acetate (CSR Chemicals); phenol formaldehyde (Monsanto Chemicals and Tonwell); polyesters (Monsanto, Polymer Corp., Reichhold); urea and melmine formaldehyde (Monsanto).

Correction

It is brought to the attention of RUBBER WORLD that in the October International Picture section, p. 116, we reported incorrectly that "More than 3,500,000 acres under rubber [in Malaya] still consist of old, unselected trees . . ." In fact, this figure refers to the total rubber acreage of Malaya; at the end of 1960 about 48% of this was already replanted with high-yielding rubber, leaving about 1,820,000 acres still in need of replanting.

PELLETIZED NEWS

Rubber shipments from Sarawak during the first eight months of 1961 came to 31,272 tons, down from the 36,249 tons reported in the corresponding period of 1960.

Final plans have been submitted to the National Economic Development Bank for establishment of a plant in Recife, Brazil, to produce polybutadiene rubber, using alcohol from local sugar cane. Estimated annual capacity of the proposed unit is 27,500 metric tons. The Firestone Tire & Rubber Co., Akron, O., would reportedly operate the plant.

Declining yields from overage trees on Central Java estates are held largely responsible for the considerable drop in estate production in 1961. About half the trees in this region are reportedly past their prime. The government intends to encourage higher standards by offering a premium of 16,000 rupiahs per hectare (hectare = about 2.45 acres) to every estate over 25 hectares producing high-grade rubber.

While Dunlop and Michelin (British) are preparing to establish tire factories in eastern and western Nigeria, Communist countries are pushing their special interests. Poland and Czechoslovakia are reported to have entered into trade agreements with Nigeria. They would supply equipment, industrial plants, and consumer goods in exchange for rubber and other Nigerian products. Poland will also provide ships.

Now you can greatly increase warehouse space at no increase in cost with...

AZODOX high apparent density zinc oxides

- Easier to Handle
- Stacks Higher, Safely
- Less Bag Breakage
- Close-Packed, Unitized Shipments

AZODOX stores in much less space than other zinc oxides. That's because you get many more pounds of AZODOX per cubic foot of pigment—up to 62 lbs. per cubic foot! Save valuable space for other purposes with every ton of AZODOX you buy.

In the manufacture of AZODOX, an exclusive process removes excess, space-wasting air from between individual particles of zinc oxide. Actual pigment density and every other desirable property remain unchanged. High apparent density AZODOX flows freely yet dusts less, incorporates fast and disperses thoroughly.

AZODOX is available in the following grades at no additional cost over conventional zinc oxides:

	Bulk Density lbs./cu. ft.	Rate of Activation	Reinforcement Properties
AZODOX-44 (Conventional)	60	Medium	High
AZODOX-55 (Conventional)	60	Fast	High
AZODOX-55-TT (Surface Treated)	62	Fast	High
AZODOX-550 (Conventional)	58	Medium	High

For technical data, fill in and mail this coupon.

AMERICAN ZINC SALES COMPANY
1515 Paul Brown Bldg., St. Louis 1, Mo.

Please send me technical information about...

- ☐ AZODOX-44
- ☐ AZODOX-55
- ☐ AZODOX-55-TT
- ☐ AZODOX-550
- ☐ 15 types of AZO brand zinc oxides

Name.....Title.....
Company.....
Address.....
City.....Zone....State.....

American zinc sales company

Distributors for
AMERICAN ZINC, LEAD AND SMELTING COMPANY
Columbus, Ohio • Chicago • St. Louis • New York

BULGARIA, with substantial Soviet aid, will build an oil refinery near the seaport of Burgas on the Black Sea. It is planned to process 2,000,000 tons of crude oil annually by 1963. A 19-mile pipeline will be required to transfer the oil supplied by Russian tankers from the port to the plant. Ethylene and polyethylene production is also planned for the refinery. Sufficient ethyl alcohol from the ethylene is expected to be available for an annual output of 30,000 tons of synthetic rubber to be made in another plant.

More than 50,000 acres of Indonesian rubber land have been replanted with new high-yielding seedlings this year. The 1961 replanting target of 36,000 estate acres was reached, and more than 14,000 acres were replanted by smallholders, from whom nothing had been expected. The Department of Agriculture hopes that between now and 1969, estates will continue replanting at the current rate, and that smallholder replanting will rise to 48,000 acres a year.

The Ivory Coast's first latex factory, at the Eleis plantations, Bingerville, about 20 kilometers from Abidjan, has been opened by Charles Donwahi, Ivory Coast Minister of Agriculture & Cooperation. It is producing between 1½ and two tons of latex per day. A second latex plant, to open in 1964, is to be erected in Pakidie, about 60 kilometers from Abidjan. Yearly capacity will be 3,700 tons, according to Compagnie des Cautchoucs de Pakidie, owner of the installation.

A tire factory, of Russian design, is planned to be built at Voljsk, near Volgagrad. Automation will permit the workers to produce 54 pounds of finished product per man per hour. The machinery and equipment for handling, storing, and automatic weighing of raw materials will be supplied by Simon Handling Engineers, Ltd., Stockport, England. The English firm is a member of the Rustyfa group and designed and equipped the huge Dniepropetrovsk tire plant which went on stream in August, 1961.

A Rumanian tire factory is being equipped by Rustyfa and will include five tire testing machines built by Heenan & Froude, Ltd., Worcester, England. One of the machines is designed to apply a maximum load of 15,000 kilograms; two for 5,000 kilograms; and two for 2,000 kilograms. The three largest machines are equipped with special eccentric steel drums to test giant-size and earth-moving equipment tires under severe conditions.

The Goodyear Tire & Rubber Co., Akron, O., dedicated a new $12-million tire and tube plant in Ballabgarh, Punjab, India, about 20 miles south of New Delhi. The plant is operated by the subsidiary Goodyear International Corp.

THE NIGERIAN GOVERNMENT is intensifying efforts to raise the quantity and quality of rubber produced in Western Nigeria. Rubber plantations that have been ruined by bad tapping are to be replanted with new, high-yielding trees. New planting is also being encouraged. Farmers have already received two million superior seeds from two local estates. A nursery plantation, started with rubber seeds from Liberia, with the aid of subsidies will eventually supply superior seed at a reduced cost. Farmers are also being trained in the correct methods of tapping and preparing good-quality latex.

PLUS
VALUES
IN CLAYS
FOR EVERY RUBBER NEED

Buca
Extra-fine particle sized, pH-controlled, water-washed kaolin
for synthetic rubbers, especially SBR and NEOPRENE

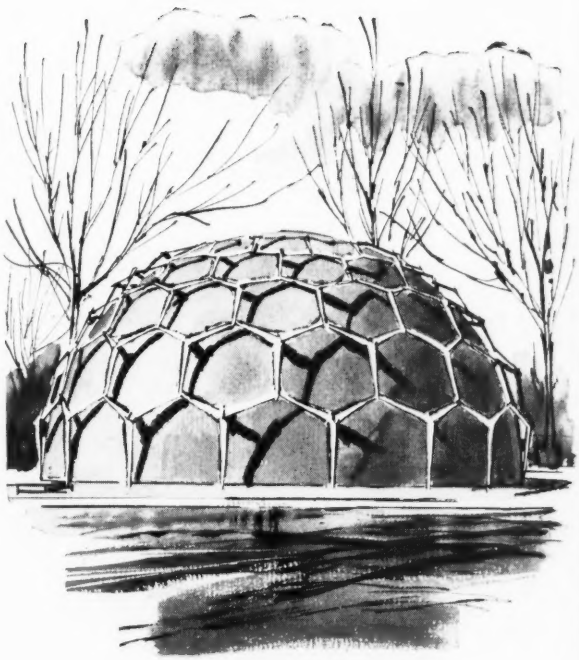
Whitetex
High whiteness; excellent extrusion and electrical properties
for all rubbers, especially BUTYL

Catalpo
Fine particle sized; water-washed kaolin of uniform pH to control cures
for general compounding, especially SBR and NEOPRENE

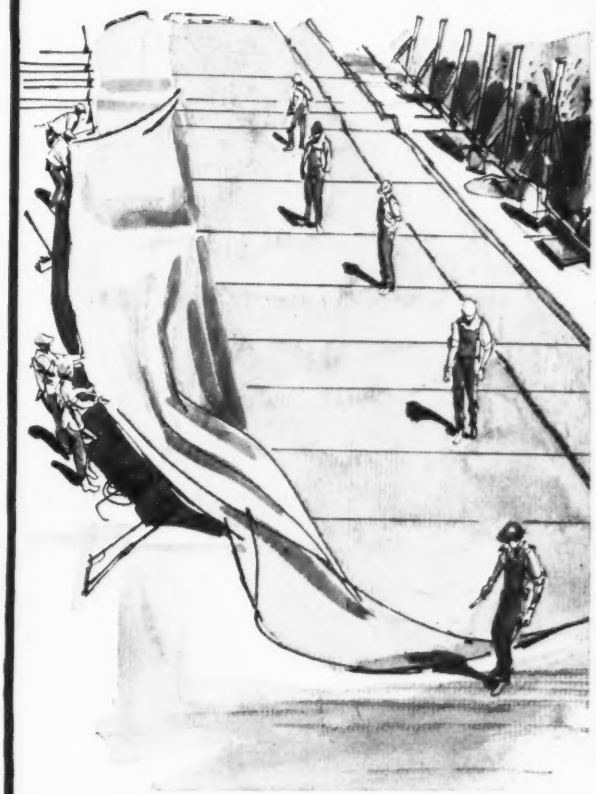
Pigment #34
Complex Al silicate with low permanent set and high resilience
for synthetic rubber, especially SBR

SC
SOUTHERN CLAYS, INC.
33 RECTOR STREET, NEW YORK 6, N. Y.

What's News in Rubber...



LIGHTWEIGHT, DURABLE, permanently flexible and applied cold – that's the colorful new Butyl roofing system at Longway Planetarium, Flint, Mich., designed by Smith, Hinchman & Grylls Associates, Inc. (Detroit).



PROTECTION FOR BUILDING FOUNDATIONS from both hydrostatic pressure and water infiltration is provided by sheeting of Enjay Butyl rubber. Butyl's high tear strength withstands rough handling on the job site.

Enjay Butyl...for top-to-bottom protection

Top-to-bottom building protection can be achieved more effectively than ever with a remarkable rubber known as Enjay Butyl – now available from rubber manufacturers in a variety of useful forms including extruded shapes, sponge stock, molded parts, tape and caulking, calendered sheet and latex coating.

Enjay Butyl, when properly compounded and processed, offers outstanding resistance to aging, ozone and oxidation; high tear strength and low permeability to gases and moisture.

Enjay supplies raw material to manufacturers of Butyl rubber products for the building industry. We will be glad to furnish a list of reliable manufacturers, or to work with you in the development of new Butyl applications. For your copy of our new folder, "The Versatile Rubber for Modern Building Design," write to Enjay, 15 W. 51st Street, New York 19, New York.

EXCITING NEW PRODUCTS THROUGH PETRO-CHEMISTRY

ENJAY CHEMICAL COMPANY

A DIVISION OF HUMBLE OIL & REFINING COMPANY

ENJAY

Stockpile Plan Brings Natural Rubber Price Drop; SBR, IR Prices Cut Also

Natural Rubber

Announcement by both the London Board of Trade and the United States General Services Administration that they were liberalizing sales of stockpiled rubber touched off a wave of selling at the end of October that dropped natural rubber prices to a three-year low.

The low, reached on November 8, was 26.50¢. This was the lowest price since July 10, 1958, when the price of near rubber was 26.35¢.

Since a year ago, when prices dropped from 49¢ at the end of July to about 30¢ in mid-November, prices have moved in a narrow band between 28.50¢ and 30¢.

Here is the sequence. At the end of the September 16-October 15 period this year the price of near rubber was 29.30¢. By October 27, just before the announcement of the new policy, the price had slid to 28.70¢. On October 30, following the announcement by the British Broad of Trade, the price dropped nearly a full cent, to 27.75¢. A total of 46 lots of rubber was traded, the heaviest trading since late June.

Following the announcement by the General Services Administration that U. S. sales would be liberalized, prices continued to skid, dropping to their low on November 8. Then they rallied, going back up to 27.50¢ by November 15.

The new plan calls for GSA to sell up to 5,000 tons of stockpiled rubber when market prices of RSS #1 are less than 32¢. If the price falls below 28¢, the GSA is to reexamine policy, but not necessarily to change it.

Until now, there has been a 30¢ cutoff point on sales of stockpiled rubber. The effect shows up in a comparison between 75,891 long tons of natural rubber sold from the stockpile during the first nine months of 1960, and 18,105 long tons sold during the first nine months of this year.

Since only 5,000 tons can be sold from the stockpile each month, that would mean only 60,000 tons in a year, or 45,000 tons over a nine-month period, to make a comparison with the 1960 figures. However, consumption of natural rubber during the first nine months of this year was 50,000 tons lower than during the first three quarters of 1960.

Under these conditions there can be no question that stockpile sales can exert a downward pressure on the moribund natural rubber market. Just how much pressure depends more on changes in consumption than anything else. According to Ross R. Ormsby, president of The Rubber Manufacturers Association, Inc., a total of 1,615,000 long tons of new rubber will be consumed next year, 27% of it natural rubber. That would mean consumption of nearly half a million tons of natural rubber, enough to offset any stockpile sales handsomely.

More important than stockpile sales, of course, are the expected inroads of stereo rubbers in the U. S., and stereo rubbers and SBR abroad. The drop in natural rubber prices is, as much as anything else, a reflection of the feeling that the squeeze on natural rubber continues to tighten. The day of 25¢ rubber may be very near.

A total of 2,580 tons of rubber was sold under the Rex Contract and 2,050 under the Standard Contract during October, compared with 2,150 and 750 tons, respectively, in September. During the October 16-November 15 period, 2,590 tons were sold under the Rex Contract and 2,710 under the Standard Contract, compared with 1,560 and 990, respectively, during the September 16-October 15 period.

The price of RSS #1 on the physical market dropped from 29.38¢, October 13, to 27.50¢, November 15. The average price of RSS #1 for October was 29.28¢, compared with 30.21¢ for September, and the average for the October 16-November 15 period was 28.48¢, compared with 29.82¢ for the September 16-October 15 period. There were 22 trading days during the month and 22 for the October 16-November 15 period.

Average prices of other representative grades in October were: RSS #3, 29.00¢; #3 Amber Blankets, 27.73¢; Standard Flat Bark, 22.03¢.

STANDARD CONTRACT

1961	Oct. 20	Oct. 27	Nov. 3	Nov. 10
Nov.	29.50	28.50	27.40	——
1962				
Jan.	29.00	28.10	27.52	27.55
Mar.	28.70	27.81	27.40	27.55
May	28.60	27.65	27.40	27.50
July	28.55	27.60	27.35	27.40
Sept.	28.55	27.60	27.35	27.40
Nov.	28.55	27.60	27.35	27.40

NEW YORK OUTSIDE MARKET

1961	Oct. 20	Oct. 27	Nov. 3	Nov. 10
RSS #1	29.50	28.75	27.75	27.50
#2	29.38	28.50	27.63	27.12
#3	29.25	28.25	27.38	26.75
Pale Crepe #1 Thick	34.38	33.75	32.88	32.75
Thin	33.00	32.50	31.75	31.50
#3 Amber Blankets	27.88	27.25	26.75	26.50
Thin Brown Crepe	27.63	27.00	26.50	26.38
Standard Flat Bark	22.13	22.13	21.63	21.50

REX CONTRACT

1961	Oct. 20	Oct. 27	Nov. 3	Nov. 10
Nov.	29.70	28.70	27.55	26.95
1962				
Jan.	29.10	28.20	27.55	27.05

Synthetic Rubber

SBR producers, squeezed once more by falling natural rubber prices, trimmed their own prices November 15. At the same time, Shell Chemical Co. cut the price of polyisoprene 2¢.

The change in SBR prices, long expected because of the general fall in the price level, came in the form of a change in pricing methods.

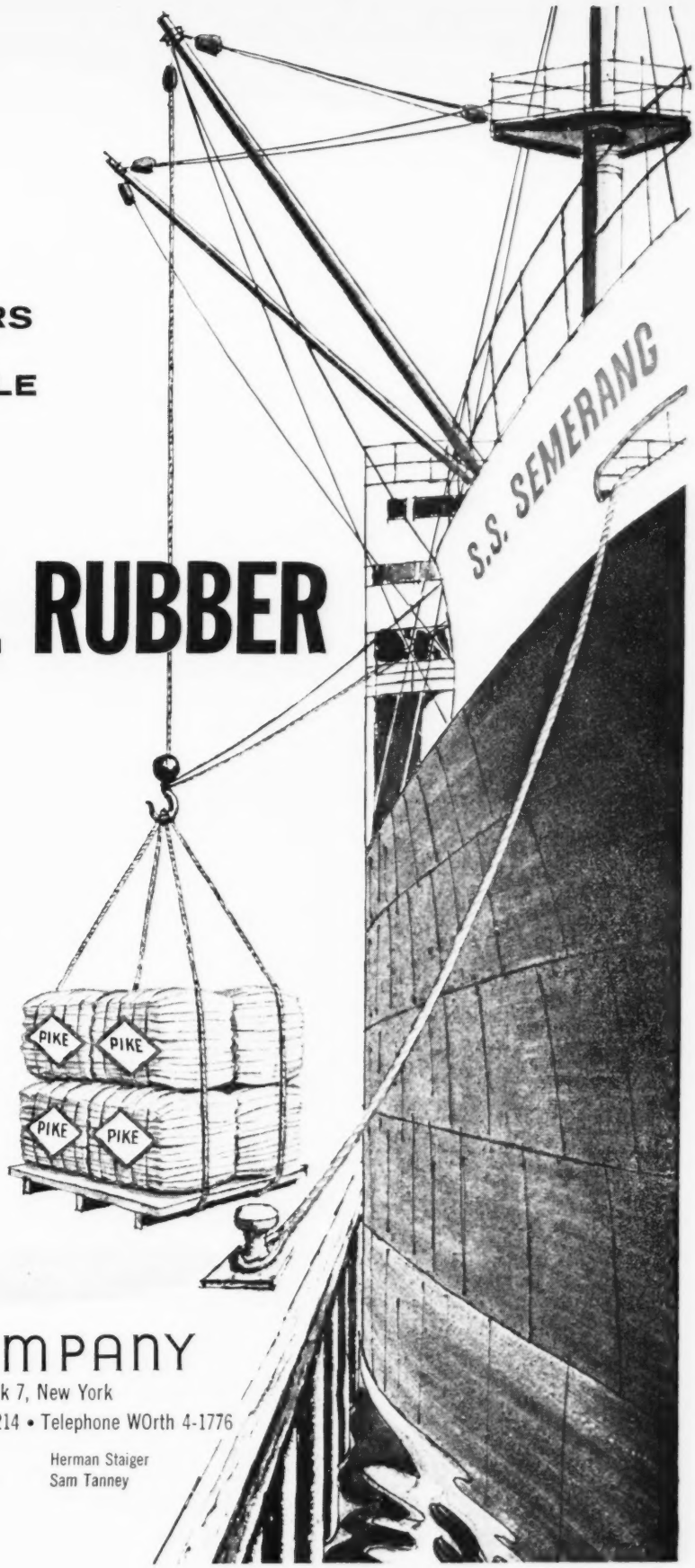
Firestone and Goodyear made the first break. They announced a change in price from 24.1¢ for the standard grades, freight prepaid, to 23¢ f.o.b. freight equalized from the nearest SBR plant to the customer. Phillips and American Synthetic Rubber Co. quickly followed suit, and other producers, though not making any immediate

FOR 40 YEARS

A DEPENDABLE

SOURCE OF

NATURAL RUBBER



Importing Natural Rubber is about 95% of our total business. We make direct purchases in many foreign lands, including Ceylon, Malaya, Sumatra, Java, Borneo, Cambodia, Vietnam, Burma, Bolivia, Brazil, Nigeria, Belgian Congo.

Forty years experience in importing Natural Rubber. Specialized grades for particular uses.

SJP

S. J. PIKE COMPANY

30 Church Street • New York 7, New York

Cable address "Pikesid, N. Y." • TWX NY 1-3214 • Telephone WOrth 4-1776

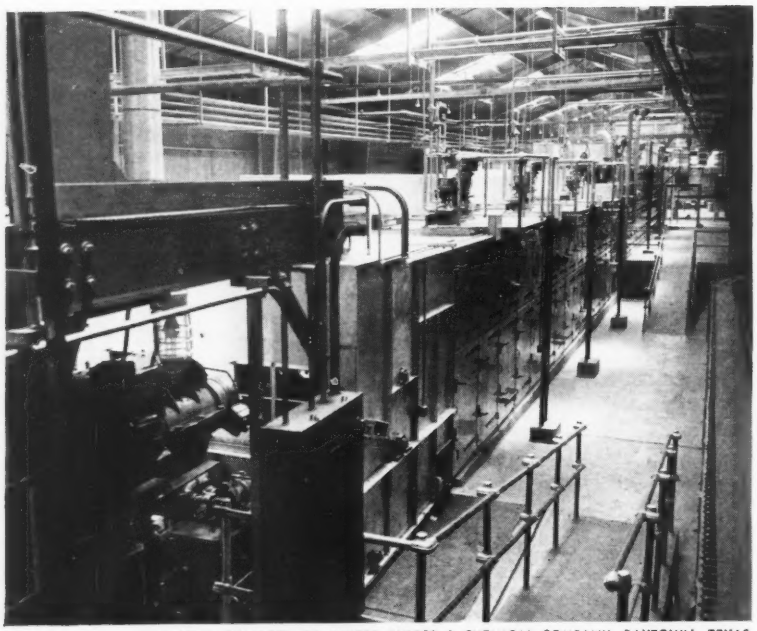
SALES DIVISION: Sidney J. Pike, George Steinbach, George Jatinen, Herman Staiger, Sam Tanney

Generally, there are three approaches by a company to the selection of a process dryer — the engineering, the economic, and the important evaluation of the intangibles. We firmly believe that SARGENT will always be found on top from every approach, for many reasons, an important one being that our machines and our people consistently deliver as promised, and more. This is the SARGENT:

- A dryer designed for your process, your required production.
- Rugged construction, trouble-free economical operation.
- Highest quality, measurably uniform drying.
- Exclusive features for efficiency and safety.
- Heat source — gas, oil, steam, electricity.
- A dryer designed for quick, easy cleanout.
- The bonus economy of the speediest, easiest installation of any machine on the market.
- Built by a company whose dryers lead the field — a company whose long experience makes a guarantee really mean something — a company that will say, "We stand unequivocally behind every machine we build."

FORMULA FOR PROFITABLE OPERATION

RUBBER DRYERS by SARGENT



PHOTO, COURTESY OF UNITED RUBBER & CHEMICAL COMPANY, BAYTOWN, TEXAS

SARGENT Single-Pass, Two-Stage Rubber Dryer

This 32-section, 2-stage master batch dryer, delivering large tonnage hourly, has a vibrating feeder, an extra-wide conveyor. Gas-fired, with each of six zones separately heated, regulated and controlled. No air recirculation through the heaters prevents contamination. Full-height hinged doors for ease of speedy, thorough cleanout. Completely automatic push-button operation and control. It meets fully the exacting, specified requirements of hourly production with complete automation, operating efficiency and the incorporation of every known safety device for the protection of personnel, machine and stock.

Another example of SARGENT advanced design and creative engineering in building a dryer that will be MODERN FOR YEARS TO COME.

C. G. SARGENT'S SONS CORPORATION

Graniteville, SINCE 1852 Massachusetts

PHILADELPHIA • CINCINNATI • CHARLOTTE • ATLANTA • HOUSTON • DETROIT
NEW YORK • CHICAGO • LOS ANGELES • TORONTO

change, said they would be "competitive."

Although the change was not announced as a price cut, the effect was the same. With SBR plants in Naugatuck, Conn., Louisville, Ky., Akron, O., Institute, W. Va., Lake Charles, La., Torance, Calif., and several plants in Texas, most manufacturers are not expected to have to pay freight costs of as much as 1.1¢ a pound, the difference between the old price and the new one. The actual savings, of course, will depend on location of particular user.

The price of SBR extended with 37½ phr. oil was also cut a cent, but SBR extended with 50 phr. oil remained the same.

Shell's cut in polyisoprene brought the price down to 23¢ a pound for Type 305, the unpigmented rubber, and the oil-extended Type 500 down to 19.5¢, f.o.b. its Torrance, Calif., plant, and 24.1¢ and 20.6¢, respectively, delivered.

The price cut was almost undoubtedly caused by the drop of about 2¢ in natural rubber prices during the October 16-November 15 period, since Shell has consistently tried to keep its polyisoprene price slightly below that of natural rubber.

In mid-October a year ago, when Shell began full-scale production, it set the price of its polyisoprene at 32¢. A month later, as natural rubber prices plummeted, the price was cut to 27¢. At that time the price of RSS #1 was about 29¢. During the past year prices were cut again, first to 26¢, and then to 25¢.

The latest cut, to 23¢, came when the price of RSS #1 had dropped to under 27¢, although the price of natural rubber later rallied.

In spite of the low price of polyisoprene, 7¢ a pound under the present 30¢ price for polybutadiene, buyers do not seem to be showing nearly so much enthusiasm for polyisoprene as for polybutadiene.

The reason, of course, is that although the price of RSS #1 is now about 27¢ (as of November 15), the price of the most used grades is anywhere from 2-4¢ lower, bringing the price to the average buyer down to perhaps 24¢.

At this price, many users of natural rubber see no need to switch to polyisoprene, which is quite similar to natural rubber. They feel, on the other hand, that the added abrasion resistance and low-temperature properties of polybutadiene make it desirable for blending with natural rubber or SBR.

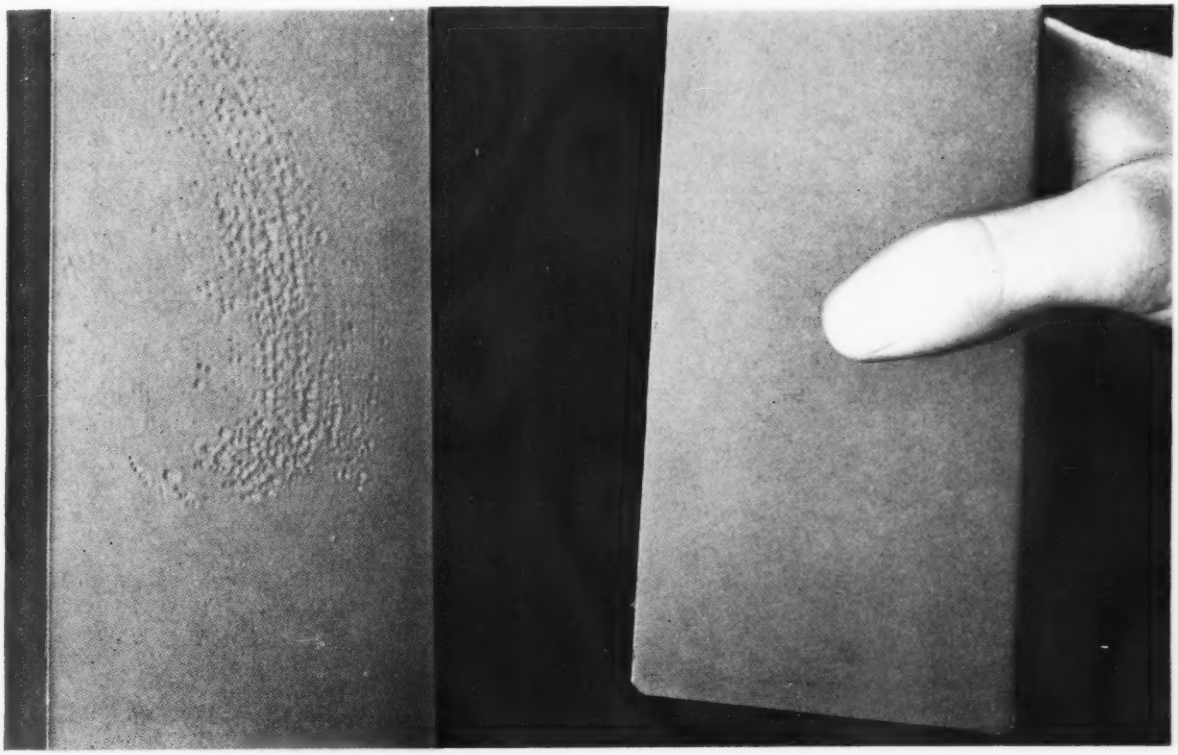
The drops in the prices of both natural rubber and polyisoprene, however, may bring pressure for further cuts in the price of polybutadiene, particularly when more plants go on stream.

Consumption of new rubber in the United States for September amounted to 129,855 long tons, compared with the 135,198 long tons consumed during August, according to the monthly report of the RMA.

Consumption of all types of synthetic rubber in September totaled

SILICONE NEWS from Dow Corning

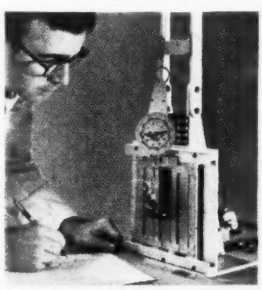
Now... paintable release!



Here's a silicone mold lubricant you can paint over without problems!

If you've ever shied away from using a silicone mold lubricant because of *painting* or *adhesion* difficulties, forget it! Dow Corning research now offers you:

DOW CORNING 230 FLUID—an all-silicone solvent-soluble release agent; and its water-dilutable dispersion—DOW CORNING 231 EMULSION.



Laboratory and field tests confirm the effectiveness of the new Dow Corning release agents.

Now, you can paint rubber and plastic parts released from molds lubricated with the new silicone release agents. What's more, accidental transfer of the silicones from rubber parts to metal surfaces creates no problem in subsequent painting or bonding operations.

Ordinary cleaning procedures for removing oil or grease prior to painting or bonding effectively prepare parts made with these new silicone release agents. A few of the methods: wiping with a solvent-saturated cloth, rinsing in solvent or alkaline solution, or vapor degreasing.

You can see the difference! A conventional silicone fluid was rubbed onto the panel at left above. Dow Corning 230 Fluid was rubbed onto the panel at right. The panels were both cleaned similarly and then spray-painted. Note the difference in the degree of wetting of the two surfaces by the paint. Subsequent scratch tests bring out the superior adhesion of paint to the panel at right.

Clean, easy parting. Both Dow Corning 230 Fluid and Dow Corning 231 Emulsion give the fast, clean, easy release recognized attainable only with silicone release agents . . . and also deliver money-saving, minimum build-up that keeps mold maintenance costs low.

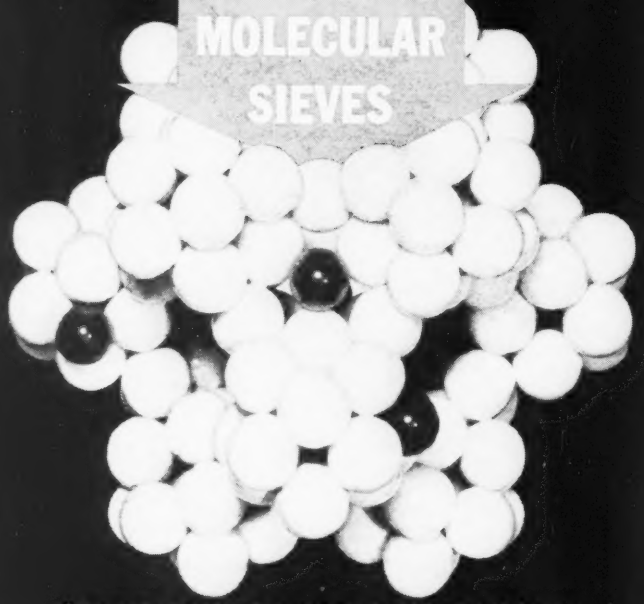
Free trial samples of these new silicone mold lubricants are immediately available. Write on your company letterhead to Dept. 9636, Dow Corning Corporation, Midland, Michigan.

first in silicones

Dow Corning

Technical Service for your process

...with LINDE CHEMICAL-LOADED MOLECULAR SIEVES



LINDE EXPERTS CAN ASSIST YOU IN ANY PHASE OF CHEMICAL CONTROL

LINDE Molecular Sieves can adsorb or "load themselves" with several catalytic chemicals and effectively trap them for future controlled release.

Laboratory and engineering capabilities at LINDE now provide complete service on processes and systems using Chemical-Loaded Molecular Sieves. Technical Service is provided for all phases of an application—from inception to commercialization. In addition to ready availability for commercial processes, CLMS via custom-loading and self-loading are available for research, application development, pilot plant study, and semi-commercial production.

Whether your control problem involves catalysis, toxicity, corrosion, or volatility, LINDE Chemical-Loaded Molecular Sieves and technical service offer a proven solution.

For details, write Dept. RW-12 Linde Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, New York. **In Canada:** Union Carbide Canada Limited, Linde Gases Division, Toronto 12.

LINDE and UNION CARBIDE are registered trade-marks of Union Carbide Corporation.

Linde MOLECULAR SIEVES

"The Original Synthetic Zeolite" (Patented)

UNION CARBIDE

92,750 long tons, contrasted with 97,400 long tons consumed in August. Natural rubber consumption totaled 37,105 long tons, against 37,798 long tons in August.

During the month, synthetic rubber accounted for 71.43% of total new rubber consumption, compared with 72.04% for August. During the first nine months of the year synthetic rubber accounted for 71.60% of new rubber consumption, against 68.74% for the first nine months of 1960.

Consumption of synthetic rubber (in long tons) by types during September was: SBR, 74,985, compared with 78,955 in August; CR, 7,280 against 7,324 in August; IIR, 5,205, against 5,518 in August; NBR, 2,865, against 3,015; and stereo and other elastomers, 2,415 against 2,588.

Production of synthetic rubber was 116,226 long tons for September, compared with 114,936 long tons produced in August.

Production (in long tons) by types during September was: SBR, 93,655, compared with 93,824 in August; CR, 9,654, compared with 8,279 in August; IIR, 5,845, against 6,312 in August; NBR, 3,552, against 3,172; and stereo and other elastomers, 3,520, against 3,349.

Reclaimed Rubber

The reclaimed rubber business was good for the October 16-November 15 period, reclaimers in both the Midwest and the East report. One eastern reclaimer estimates that sales for the fourth quarter of the year will exceed by 10% sales for the corresponding period of 1960. The settlement of the recent automotive strikes is credited with the pick-up in business.

Production of reclaimed rubber in September was 20,200 long tons, down from 22,505 long tons in August. Production for the first nine months of 1961 was 195,643 long tons, contrasted with 227,191 for the same period last year.

Consumption in September was 20,195 long tons, compared to 20,588 tons in August. Consumption in the first nine months of the year was 183,950 long tons, against 212,840 for the corresponding months of 1960.

Production and consumption figures are expected to be higher for the last quarter of 1961.

RECLAIMED RUBBER PRICES

Whole tire, first line	$0.115
Third line	.1075
Inner tube, black	.17
Red	.22
Butyl	.16
Light carcass	.22
Mechanical, light-colored, medium gravity	.185
Black, medium gravity	.10

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality workability, and specific gravity, at special prices.

NEW!

when your products must be whiter-than-white

...specify new blue-white

GLIDDEN ZOPAQUE®
R-44 TITANIUM DIOXIDE

Vinyl floor tile, rubber heels, sheeting, toys and other rubber and plastic products attain ultimate whiteness when pigmented with new R-44 Titanium Dioxide.

High whiteness R-44 makes possible stronger whites at lower pigment loadings than is possible with conventional titanium dioxide. And its smaller particle size provides cleaner, sharper pastels with lower TiO_2 content.

Find out what this new grade of Glidden *Zopaque* Titanium Dioxide, created exclusively for rubber and plastics, can do for your products. Write for complete information.

QUALITY Glidden PRODUCTS

THE GLIDDEN COMPANY
FINEST PIGMENTS FOR INDUSTRY
Chemicals Group • Pigments and Color Division
Baltimore 26, Maryland

Tire Cord

Packaged production of high-tenacity rayon yarn rose from 20.9 million pounds in September to 22.5 million pounds in October, the highest production rate reached this year, but lower than the 23.3-million-pound monthly average achieved in 1960. Domestic shipments of the yarn also reached a peak in October, rising to 22.8 million pounds from 21.4 million in September, and against 22.3 million in January, the previous high for this year.

Total shipments, including exports, were highest for the year in October at 24.7 million pounds. Stocks at the end of October were a low 15.6 million pounds, contrasted with 17.8 million on September 30 and 20.3 million on August 31.

Production of rayon tire cord and tire fabric in the third quarter of 1961 increased to 50,287,000 pounds, up 11% from 45,303,000 pounds in the second quarter. During the same period, however, nylon production decreased 17% from 43,046,000 pounds in the second quarter to 35,555,000 pounds in the third.

American Enka Corp. announced that it has switched its entire production of rayon tire yarn to an improved Tyrex yarn called Enka 5000. Prices of the new cord are the same as those of the yarn it replaces.

Production of cotton tire cord and tire cord fabrics stayed about the same—6,140,000 pounds for the third quarter, compared to 6,166,000 pounds for the second. Production of all tire cord and tire fabric during the July-to-September period was 94,657,000 pounds, 3% below the previous quarter's produtcion rate, but 2% higher than output for the third quarter last year.

RAYON PRICES

Tire Fabrics

1100/980/2	$0.69
1650/1500/2	.60

Tire Yarns

High-Tenacity	
1100/490	.57
1100/980	.57
1150/490,980	.56
1650/1100	.51
2200/1440	.48
3300/2200	.48

NYLON PRICES

Tire Yarns

840/140	.92
1680/280	.92

Latex

A slight increase in activity in the drum latex market which began near the end of October was maintained during the rest of the October 16—November 15 period. Interest was mainly confined to near shipments, with the futures market running a bit slower. More activity was also noticed in the bulk latex market toward the end of the period, and the price differential between dry rubber and latex improved in the case of both types of latex.

The price of ASTM centrifuged natural latex, in tank-car quantities, f.o.b. tank car, was 31.97¢ per pound solids on November 15, down from 34.36¢ on October 15 and 35.87¢ on September 15. Malayan production in September amounted to 8,794 tons, compared to 9,738 tons in August. The total output for January-September, 1961, of 74,092 tons shows a decline of 16.46% from the 88,619 tons produced during the corresponding period last year.

Consumption of natural and synthetic latices in the United States in September was 13,175 tons, somewhat lower than the 13,326 tons consumed in August. The ratio of natural to synthetic latex consumed in the United States in September was 27.02%, or 3,560 tons of natural latex.

Prices of synthetic latices remained at 26¢ to 40.24¢ for SBR; 37¢ to 57¢ for CR; and 45¢ to 60¢ for NBR.

(All figures in long tons, dry weight)

Type of Latex	Production	Imports	Consumption	Month-End Stocks
Natural				
Aug.	0	2,617	3,881	7,294
Sept.	0	*	3,659	6,108
SBR				
Aug.	8,911	....	7,420	9,427
Sept.	9,027	....	8,025	8,691
Neoprene				
Aug.	908	....	990	1,402
Sept.	1,117	....	876	1,580
Nitrile				
Aug.	1,040	....	1,035	2,339
Sept.	1,114	....	1,199	2,202

* Not available yet for period covered.

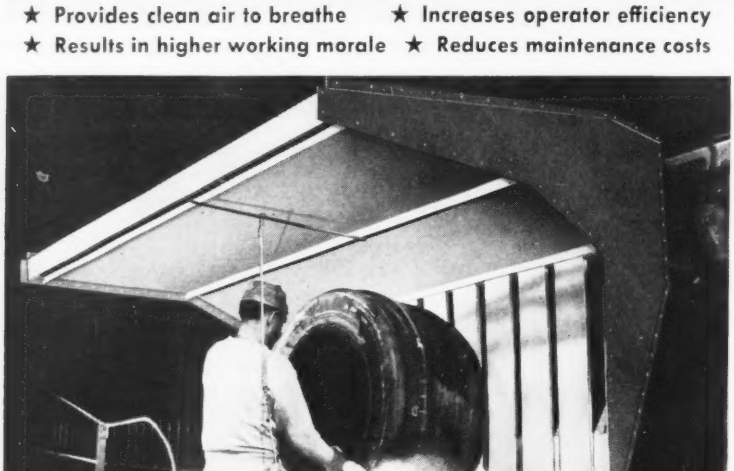
Scrap Rubber

Consumption of scrap rubber continues to run a little higher than during last year, with synthetic butyl tubes enjoying the highest interest, still selling at 7¢ a pound, baled and free of valves. Prices of mixed auto tubes dropped from 6¢ on October 16 to 5¼¢ on November 15, both in Akron and the East. Black passenger tubes were quoted at 5¾¢ in Akron on November 15, down a quarter of a cent from the same date in October. Other prices remained unchanged for the October 16-November 15 period.

	Eastern Points	Akron, O.
	Per Net Ton	
Mixed auto tires	$7.00/$11.00	$11.00
S.A.G. truck tires	nom.	nom.
Peeling, No. 1	nom.	nom.
2	nom.	nom.
3	nom.	nom.
	(¢ per Lb.)	
Auto tubes, mixed	5.25	5.25
Black	6.00	5.75
Red	nom.	nom.
Butyl	7.00	7.00

CONTINUOUS, AUTOMATIC OBP DUST REMOVAL

★ Provides clean air to breathe ★ Increases operator efficiency
★ Results in higher working morale ★ Reduces maintenance costs

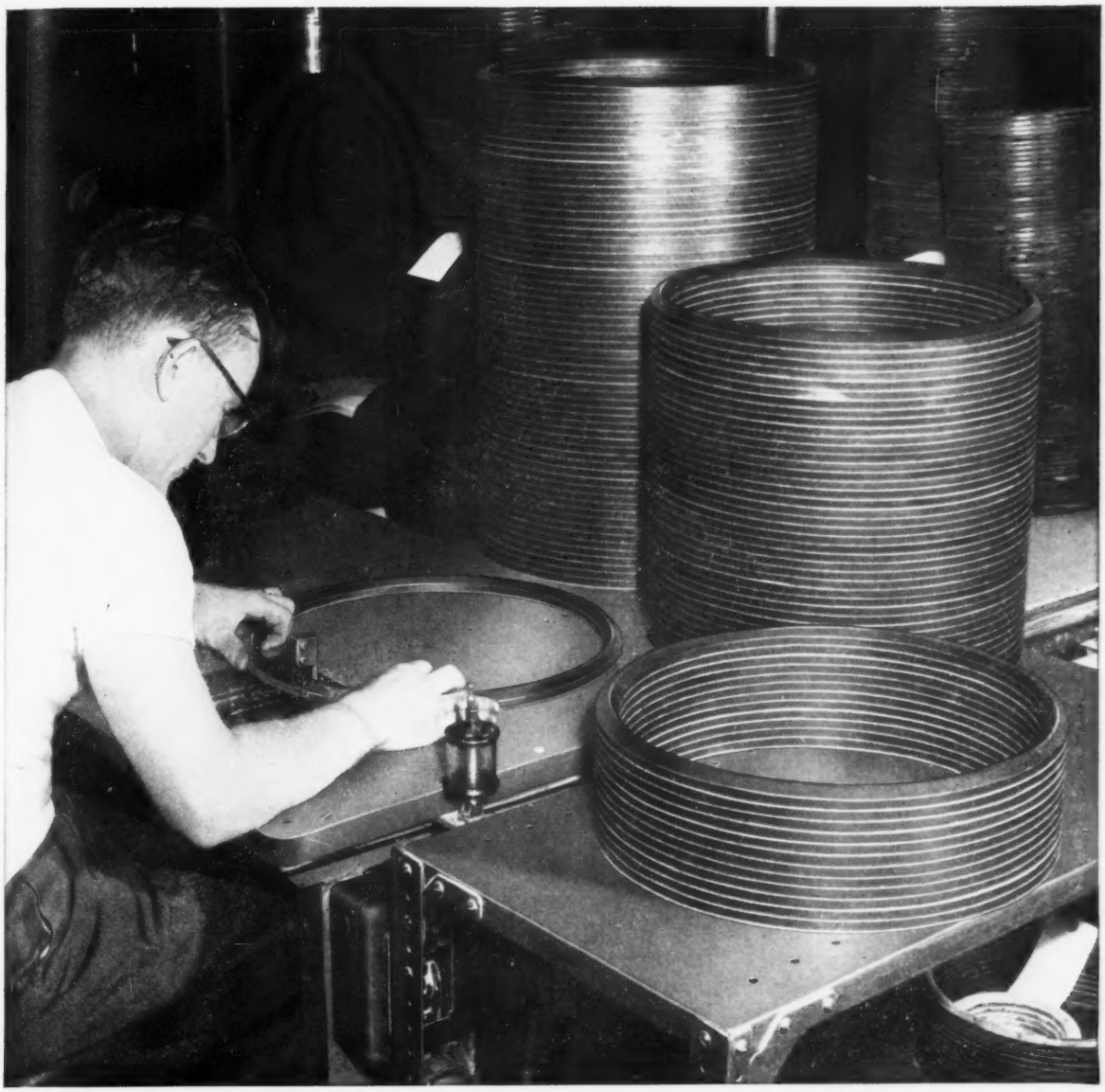


Illustrated is special hood developed for pneumatic pick-up of over-spray for the rubber industry.

Call an OBP engineer for a no obligation survey of your requirements. You may be surprised at the money you can save.

OHIO BLOW PIPE CO.
1734 DOAN AVENUE
CLEVELAND 12, OHIO

... leader in design, manufacture and installation of pneumatic handling and dust control systems



SELF-ADJUSTING SEAL—A product of Garlock Inc., CHEVRON* Packing provides an automatic seal for rams, accumulators, plungers, hydraulic cylinders, and reciprocating pump rods as well as for many other applications. Its distinctive shape makes it possible for CHEVRON* Packing to adjust automatically to variations in pressure – with increasing pressure the rings tighten; with diminishing pressure, the packing eases off, reducing friction to a minimum. Made with many different rubber compounds in literally thousands of different sizes from ¼" to 70" and larger in diameter, CHEVRON* Packing is capable of withstanding temperatures from −65°F to +500°F, and pressures from vacuum to 30,000 psi depending on the application. Many types of CHEVRON* Packing are made with Mount Vernon Duck.

This is another example of how fabrics made by Mount Vernon Mills, Inc., and the industries they serve, are serving America. Mount Vernon engineers and its laboratory facilities are available to help you in the development of any new fabric or in the application of those already available.

UNIFORMITY
Makes The
Big Difference

Mount Vernon Mills, inc.

A LEADER IN INDUSTRIAL TEXTILES

TURNER th HALSEY COMPANY

SELLING AGENTS

Main Office and Foreign Division: 40 Worth Street, New York, N. Y.

Branch Offices: Chicago • Atlanta • Baltimore • Boston • Los Angeles

*GARLOCK Registered Trademark

Makes Adhesives Bond Better

Bostik 4008 TIE COAT

This is an extra-ordinary primer and tie coat that locks itself to substrate, makes it possible to use common, low-cost adhesives for more critical bonding. Especially good when bonding plastic and rubber-like materials to metal.

This is how you benefit from Bostik Adhere*Ability* — the skill of making the most out of standard adhesives in place of exotic or expensive types. Your Bostik representative will help you specify the right Bostik number and provide application assistance.

Send for the new Bostik METHODS . . .

provides up-to-the minute data and information on the newest in adhesives, plus money-saving ideas and applications.

Whatever your adhesive need write: Bostik, BB CHEMICAL CO., Subsidiary of United Shoe Machinery Corporation, 784 Memorial Drive, Cambridge, Mass.

Bostik®

ADHEREABILITY

The Skill of Making Things Stick

OBITUARY

Joseph A. Talalay

Joseph Anton Talalay, retired rubber technologist, died October 15 in New Haven, Conn., after a brief illness.

Dr. Talalay, who was connected with the rubber industry for more than 50 years, was best known for his extensive contributions to the technology of foam rubber. In 1935, while in England, he developed a process for making foam rubber by the vacuum expansion of latex containing small amounts of hydrogen peroxide and catalyst. In 1945 he discovered a radically new mechanism for gelling foam rubber, involving the rapid freezing and subsequent permeation of the frozen foam with carbon dioxide.

This was followed by the invention of post-reinforcement of foam rubber with colloidal dispersions. The "Talalay Process" for the manufacture of foam rubber is in world-wide use today.

Talalay was born in Mohilev, Russia, in 1882, and attended high school in his native town. He received a Ph.D. in physics and mathematics from the University of St. Petersburg in 1906, and a degree in mechanical engineering from the Imperial Institute of Technology in Moscow in 1913.

Upon graduation he joined the staff of Bogatyr Co., Moscow, as an engineer in charge of steam-power generation. He was appointed chief engineer in 1915, and technical director in the following year.

After leaving Russia in 1920, he settled briefly in Riga, Latvia, where with some former colleagues he founded the First Latvian Rubber Mfg. Co., Varonis.

In 1922, Talalay became technical director of Nordgummiwerke A.G., Berlin, Germany, a producer of mechanical rubber goods and drug sundries. He remained there until 1927 and then joined S. Herz GmbH, also in Berlin, as technical director.

He left Germany for Bedford, England, in 1933, where he founded Magna Rubber Co. with J. A. Howard, the inventor of rubberized hair.

The deceased came to the United States in 1940 and was director of research for the Converse Rubber Co., Malden, Mass., from 1942 until 1944. In 1945 he moved to New Haven, Conn., where he was engaged in research and development in the latex foam rubber field.

From 1948 until his retirement in 1953, Talalay was research consultant to the Sponge Rubber Products Co., Shelton, Conn., now B. F. Goodrich Sponge Products.

Dr. Talalay published many articles and papers during his lifetime. Perhaps the most significant is the contribution of three chapters on compounding principles, footwear, and the manufacture of rubber erasers, to Dr. E. A. Hauser's "Handbuch der Gesamten Kautchuk Technologie," published in 1934. In 1954, Talalay published a fundamental study and mathematical analysis of the load carrying capacity of latex foam rubber.

Jack Stock Studio

Joseph A. Talalay

The deceased was a member of the American Chemical Society, the Institution of the Rubber Industry (England), and the American Association for the Advancement of Science.

Surviving are his widow, four sons, and eight grandchildren.

■

Correction

In the article, "New Techniques for Evaluating Pigment Dispersion in Rubber—I," by William M. Hess, Columbian Carbon Co., which appeared in the November issue of RUBBER WORLD, pages 78 to 83, there were several errors which crept in inadvertently.

These errors are as follows:

1. The micrograph picture which was used on the cover of the issue showed agglomerates of carbon black, not zinc oxide, as stated in the box on the table of contents page.

2. In Figure 2, page 80, the negative microradiogram was on the left, and the light micrograph on the right. A reference in the text, page 81, stating that the pigment agglomerates in this latter micrograph appeared black is also incorrect. There were a few black specks visible, but these were due to a small amount of carbon contamination included during mixing rather than the pigment under study.

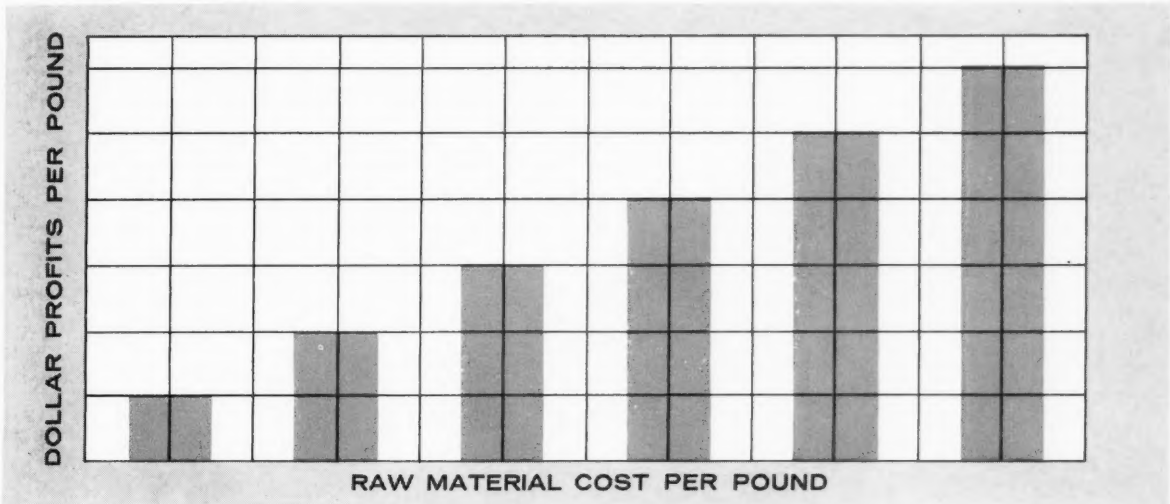
3. The contact microradiography unit (Phillips CMR) described on page 81 produces soft X-rays in the 1 to 5 k.v. range rather than in the 1 to 3 k.v. range, as indicated in the article.

4. Footnote 8 on page 80 should read: *"Industrial and Engineering Chemistry,"* 43, 2564 (1951).

The concluding second part of this article will be found this month on page 80.

SILICONE NEWS from Dow Corning

Your profit – our business



If you use Silastic,® you know how Dow Corning helps earnings

Profits are everybody's business. They're the lifeblood of industry and the economy. Here's how Silastic, the Dow Corning silicone rubber, helps to improve your profit picture.

Research & Development If you are a member of the technical staff, you influence profits through the development of new rubber compounds, or in the design of parts to take advantage of the benefits of these compounds.

How does Dow Corning help? New and improved Silastic compounds and compounding bases as well as helpful technical information about these products are supplied continually. These basic materials provide you with variable *arbitrary* properties — durometer range, tensile strength, compression set — and constant *inherent* properties — heat resistance, low temperature flexibility, weathering stability and oil resistance.

Purchasing If you're a P.A., you contribute to earnings by the profitable procurement of quality elastomers.

How does Dow Corning help? Despite sharply rising prices in other areas, the average price of Silastic has remained unchanged since Dow Corning introduced the first commercial silicone rubber materials 15 years ago. In fact, the price of some Silastic stocks has been reduced!

Then, through strategic placement of Dow Corning warehouses throughout the country, you fill your silicone rubber requirements with Silastic *promptly*, thus keeping raw material inventory to a minimum.

Production If production is your problem, you need materials that process easily and simply for efficient operation.

Silastic processes on standard rubber equipment without major changes in manufacturing techniques or standards. Dow Corning quality control provides you with a silicone rubber you know is uniform from batch to batch. And to aid you in achieving maximum efficiency, Dow Corning's customer advisory service is always ready to provide immediate assistance on production problems.

Marketing As a marketing man, one of your contributions to company profits is the moving of a sufficient volume of a product at a price to assure profits.

How does Dow Corning help? The cost of producing finished parts made of Silastic is higher than with some other elastomers — higher raw material cost is the reason. Now, if your percent profit for Silastic parts is the same as your other product lines, that means *more dollars* of profit.

Silastic and all its benefits as a quality elastomer are extensively advertised in the national trade press. Advertising builds interest in Silastic—new prospects for you. Thanks again to advertising, new applications for rubber parts requiring the inherent properties of Silastic brand silicone rubber are continually opening up. This means new markets for you.

Yes, your profits *are* our business. If you have not taken full advantage of these Dow Corning services, why not investigate?

For full details on Silastic as an aid to greater profits, write: Manager, Silastic Sales, Dow Corning Corp., Midland, Mich.

first in silicones

Dow Corning

statistics of the rubber industry

U. S. Consumption of Natural And Synthetic Rubber*

(Long Tons)

Year	Natural	SBR	IIR	CR	NBR	Total
1960	479,179	903,401	61,794	81,055	31,834	1,557,263
1961						
Jan.	35,512	71,653	5,143	6,345	2,591	121,244
Feb.	31,871	64,710	4,544	5,802	2,121	109,624
Mar.	34,908	71,110	5,005	6,592	2,559	120,916
Apr.	33,207	68,287	4,653	6,101	2,743	116,020
May	35,284	74,188	5,142	6,563	3,067	125,848
June	35,876	75,587	5,117	7,088	3,134	126,588
July	30,019	64,383	4,797	5,180	2,334	108,377
Aug.	37,798	78,955	5,518	7,324	3,015	97,400
Sept.	36,956	75,554	5,250	7,346	3,140	93,644

* Including latex.
Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U. S. Imports and Production of Natural And Synthetic Latices

(Long Tons, Dry Weight)

Year	Natural	SBR	CR	NBR	Total Synthetic	Natural and Synthetic
1960	46,655	101,220	12,746	13,418	127,384	174,039
1961						
Jan.	4,761	7,821	853	1,174	9,848	14,609
Feb.	4,719	6,286	727	966	8,069	12,788
Mar.	3,855	8,500	936	763	10,468	14,323
Apr.	3,029	7,703	1,167	1,008	9,878	11,907
May	2,796	8,614	729	1,095	10,458	13,254
June	2,009	8,314	954	1,090	10,358	12,367
July	6,019	5,626	1,000	782	7,408	11,027
Aug.	2,617	8,911	908	1,040	10,859	13,476
Sept.		9,027	1,117	1,114	11,258	....

Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U. S. Imports and Production of Natural and Synthetic Rubber*

(In Long Tons)

Year	Natural	SBR	IIR	CR	NBR	Natural and Synthetic
1960	378,937	1,166,151	97,950	134,442	37,899	1,815,369
1961						
Jan.	33,750	84,619	6,066	11,896	3,230	139,561
Feb.	26,766	79,892	7,875	10,344	3,134	128,011
Mar.	28,737	89,779	9,486	10,073	3,242	141,317
Apr.	24,583	87,742	8,400	8,776	3,535	133,036
May	29,871	89,662	7,391	8,871	3,578	139,373
June	34,843	85,169	5,418	8,547	3,257	137,234
July	36,516	88,733	7,763	8,267	2,887	144,166
Aug.	32,590	93,824	6,312	8,279	3,172	144,177
Sept.		93,614	5,845	9,654	3,552	....

* Including latex.
Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U. S. Consumption of Natural and Synthetic Latices

(Long Tons, Dry Weight)

Year	Natural	SBR	CR	NBR	Total Synthetic	Natural and Synthetic
1960	50,212	86,869	11,221	12,737	110,827	161,039
1961						
Jan.	3,525	6,667	779	1,005	8,451	11,976
Feb.	3,295	6,303	727	713	7,743	11,038
Mar.	3,575	6,866	936	904	8,706	12,281
Apr.	3,413	6,529	864	1,130	8,523	11,936
May	3,473	6,971	911	1,113	8,995	12,468
June	3,804	7,308	1,100	1,233	9,641	13,445
July	2,954	5,367	641	842	6,850	9,804
Aug.	3,881	7,420	990	1,035	9,445	13,326
Sept.	3,659	8,025	876	1,119	10,020	13,679

Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U. S. Exports of Synthetic Rubber*

(Long Tons)

Year	SBR	IIR	CR	NBR	Total
1960	316,253	29,649	47,580	7,707	401,189
1961					
Jan.	18,180	2,273	5,047	545	26,045
Feb.	18,949	2,425	4,010	785	26,384
Mar.	19,415	7,733	4,471	649	27,693
Apr.	18,795	1,075	2,548	708	23,496
May	17,220	1,304	3,415	681	22,620
June	15,285	1,117	2,502	693	20,130
July	16,039	1,592	2,887	753	21,919
Aug.	21,482	2,231	2,663	616	27,866

* Including latices.
Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U. S. Reclaimed Rubber*

(Long Tons)

Year	Production	Consumption	Exports	Stocks
1960	292,778	277,644	13,678	33,048
1961				
Jan.	22,528	22,052	1,084	33,101
Feb.	19,724	18,550	1,208	33,493
Mar.	21,824	20,558	1,090	32,695
Apr.	21,321	20,736	1,349	31,593
May	23,317	21,989	1,379	31,663
June	25,115	21,983	1,600	32,598
July	19,109	17,299	1,300	33,271
Aug.	22,505	20,588	1,115	33,037
Sept.	20,594	20,295	....	31,831

* Natural and synthetic.
Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

There **is** better service available in CO_2

LIQUID CO_2 Prompt and reliable CO_2 delivery is only part of the service ThermIce offers you. Each ThermIce trailer is designed to serve as an emergency standby CO_2 tank, should your own equipment or supply source fail you. Every trailer carries its own generator and pumps and can supply either liquid or vapor CO_2 directly into your process line.

DRY ICE The large fleet of new and modern ThermIce trucks at every depot assures prompt service, especially for those unscheduled "emergency" requirements caused by sudden weather changes or public utility failures. • ThermIce trucks carry extra heavy insulation to minimize sublimation. ThermIce dry ice is delivered to you at maximum size, with clean, square edges, eliminating waste in repackaging operations. • ThermIce offers *reliable* dry ice service. Every depot manager is a specialist in routing and scheduling delivery to meet your particular needs.

Subsidiary of **PUBLICKER INDUSTRIES INC.**

1429 Walnut Street, Philadelphia 2, Pa.

Philadelphia—DEwey 4-7255
New York—COrtlandt 7-8533
Jersey City—SWarthmore 8-2233
Washington, D. C.—ENterprise 1-3553

Baltimore—PEabody 2-3550
Boston—ANdrew 8-5250
Chicago—KEnwood 6-2244

Cleveland—VUlcan 3-4166
Cincinnati—621-9605
Detroit—VInewood 2-8868
St. Louis—PRospect 6-0860

DO YOU HAVE A COPY ON YOUR DESK?

COMPOUNDING INGREDIENTS FOR RUBBER

THIRD EDITION

Immediate Delivery—the Third Edition of the only book of its kind ever offered the Rubber Industry.

It contains over 600 pages of editorial content, with authoritative descriptions for each type of material or ingredient. Names and addresses of all suppliers are included. A partial list of contents follows:

Part One—DRY RUBBER COMPOUNDING MATERIALS

Part Two—LATEX COMPOUNDING INGREDIENTS

Part Three—NATURAL AND SYNTHETIC RUBBERS, LATICES, AND RECLAIMS

Part Four—NAMES AND ADDRESSES OF SUPPLIERS

RUBBER WORLD,
630 Third Avenue,
New York 17, N. Y.

Please send . . . copy(ies) of your new book "COMPOUNDING INGREDIENTS FOR RUBBER," @ $15.00 per copy in the U.S.A.; $16.00 prepaid elsewhere.

It is understood that we are privileged to return any or all copies ordered within ten days if we are not entirely satisfied.

Individual ..... Title .....

Company .....

Street ..... City ..... Zone ..... State .....

.... Check enclosed. .... Send invoice. (U.S.A. orders only)

World Production of Natural Rubber

(1,000 Long Tons)

Year	Malaya		Indonesia		All Other	Total
	Estate	Native	Estate	Native		
1960	416.2	294.3	210.5	419.5	662.2	2,002.5
1961						
Jan.	40.5	26.9	19.1	15.8	53.2	157.5
Feb.	30.8	26.0	18.0	27.6	45.1	147.5
Mar.	29.9	21.6	15.0	47.9	53.1	167.5
Apr.	27.7	21.0	15.9	55.9	51.9	172.5
May	33.6	23.7	16.0	41.2	50.4	165.0
June	36.2	26.3	18.6	26.0	47.7	155.0
July	39.2	29.4	19.2	...	...	...
Aug.	37.9	27.7	...	...	...	...

Source: Secretariat of the International Rubber Study Group.

World Consumption of Natural Rubber*

(1,000 Long Tons)

Year	U. S.	Eastern Europe and China†	U. K.	France	Germany	World Total†
1960						
Aug.	37.3	31.5	12.8	3.7	12.0	155.0
Sept.	36.8	30.1	15.6	11.5	12.5	165.0
Oct.	37.0	33.3	15.6	11.4	11.4	165.0
Nov.	36.0	33.0	15.6	10.7	12.1	165.0
Dec.	31.9	27.7	12.7	11.3	10.4	180.0
1961						
Jan.	35.1	41.3	14.1	11.2	12.2	170.0
Feb.	31.9	34.7	12.8	10.4	11.6	157.5
Mar.	34.9	38.6	14.4	11.9	11.9	170.0
Apr.	33.2	35.9	13.0	11.1	10.9	160.0
May	35.3	45.9	14.3	11.0	11.3	175.0
June	35.9	42.6	16.8	12.0	11.8	177.5
July	30.6	...	...	...	10.7	160.0
Aug.	37.8	...	...	...	11.6	...

* Figures include latices.
† Estimated or partly estimated.
Source: Secretariat of the International Rubber Study Group.

World Production of Synthetic Rubber*

(1,000 Long Tons)

Year	U. S.	Canada	Germany	U. K.	Italy	Japan	Total
1960	1,436.4	159.7	79.8	90.0	70.0	18.8	1,892.5
1961							
Jan.	108.0	13.8	6.8	8.3	6.3	2.7	150.0
Feb.	103.5	12.8	6.7	7.0	6.3	3.1	142.5
Mar.	115.0	14.2	6.7	9.6	6.3	2.9	160.0
Apr.	110.8	13.4	7.5	9.5	6.3	2.9	152.5
May	112.8	13.8	7.4	8.9	6.3	4.3	155.0
June	107.5	13.3	5.8	6.7	6.3	5.1	152.5
July	111.0	13.8	7.9	...	6.3	2.9	152.5
Aug.	114.9	...	6.9	...	...	...	...

* Figures include latices. No data available from Iron Curtain countries.
Source: Secretariat of the International Rubber Study Group.

U. S. Tire Fabric Production

(Thousands of Pounds)

	Tire Cord & Fabrics			Chafer & Other Fabrics		
	Nylon	Rayon	Cotton	Nylon	Cotton	Total
1961						
Jan.-Mar.	30.5	56.3	.8	2.2	6.2	96.0
Apr.-June	43.0	45.3	.9	2.7	5.3	97.2
July-Sept.	35.6	50.3	.8	2.7	5.4	94.7

Source: Bureau of the Census, United States Department of Commerce.

U. S. Rubber Industry Employment Wages, Hours

Year	Production Workers (1000's)	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings	Consumer's Price Index
All Rubber Products					
1939	121.0	$27.84	39.9	$0.75	
1960	198.4	99.01	39.8	2.52	
1961					
Jan.	187.5	98.81	38.9	2.54	127.4
Feb.	180.8	97.27	38.6	2.52	127.5
Mar.	179.7	97.66	38.6	2.53	127.5
Apr.	180.5	100.47	39.4	2.55	127.5
May	184.3	101.89	39.8	2.56	127.4
June	187.9	103.86	40.1	2.59	127.6
July	187.0	107.04	40.7	2.63	128.1
Aug.	191.1	...	...	...	128.0
Tires and Tubes					
1939	54.2	$33.36	35.0	$0.96	
1960	75.9	116.59	39.4	2.98	
1961					
Jan.	70.4	113.54	37.1	2.98	
Feb.	66.9	110.78	37.3	2.97	
Mar.	68.1	111.53	37.3	2.99	
Apr.	67.3	115.20	38.5	3.00	
May	67.6	115.58	38.4	3.01	
June	68.6	122.28	39.7	3.08	
July	69.4	130.31	41.5	3.14	
Rubber Footwear					
1939	14.8	$22.80	37.5	$0.61	
1960	18.4	80.23	39.5	2.03	
1961					
Jan.	18.3	82.32	39.2	2.10	
Feb.	18.9	85.60	40.0	2.14	
Mar.	19.1	82.92	39.3	2.11	
Apr.	19.3	86.65	40.3	2.15	
May	19.9	86.24	40.3	2.14	
June	20.1	82.89	39.1	2.12	
July	19.6	85.36	39.7	2.15	
Other Rubber Products					
1939	51.9	$23.34	38.9	$0.61	
1960	104.7	91.41	40.0	2.28	
1961					
Jan.	99.2	91.01	39.4	2.31	
Feb.	95.0	90.16	39.2	2.30	
Mar.	92.5	90.62	39.4	2.30	
Apr.	93.9	92.80	40.0	2.32	
May	96.8	95.00	40.6	2.34	
June	99.2	95.18	40.5	2.35	
July	98.0	95.34	40.4	2.36	

Source: BLS, United States Department of Labor.

World Consumption of Synthetic Rubber*

(1,000 Long Tons)

Year	U. S.	Canada	U. K.	France	Germany	Japan	Total†
1960	1,079.2	55.9	111.1	90.8	104.4	60.6	1,780.0
1961							
Jan.	86.2	4.4	9.5	8.4	9.8	5.7	152.5
Feb.	77.7	4.4	8.4	7.8	9.6	5.9	137.5
Mar.	86.0	4.8	9.8	8.4	9.8	6.4	152.5
Apr.	82.8	4.9	8.8	7.7	9.1	6.9	145.0
May	90.6	5.4	10.4	8.3	9.3	7.6	155.0
June	92.7	6.0	12.0	8.8	9.9	7.9	162.5
July	78.4	4.6	...	...	8.5	8.2	142.5
Aug.	97.4	...	...	...	9.4	...	...

* Including latices.
† Figures estimated. No account has been taken of synthetic rubber originating in Eastern Europe.
Source: Secretariat of the International Rubber Study Group.

Carbon Black Statistics—January-September, 1961

Furnace blacks are classified as follows: SRF, semi-reinforcing furnace black; HMF, high modulus furnace black; GPF, general-purpose furnace black; FEF, fast-extruding black; HAF, high abrasion furnace black; SAF, super abrasion furnace black; ISAF, intermediate super abrasion furnace black.

(Thousands of Pounds)

Production	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
Furnace types									
Thermal	12,195	11,630	12,724	10,031	12,885	11,987	11,617	12,788	9,582
SRF	24,487	20,005	24,173	24,388	27,107	23,499	24,263	22,954	21,547
HMF	2,774	4,191	5,116	5,508	3,196	3,528	5,142	5,494	5,030
GPF	11,847	12,077	12,782	11,078	11,583	9,640	10,192	12,679	11,071
FEF	17,025	19,145	16,824	15,973	17,339	20,756	20,404	20,535	17,251
HAF	45,286	33,369	42,988	43,961	51,179	40,633	37,031	36,758	41,356
SAF	218	3,057	1,094	758	1,921	3,108	3,011	1,181	3,139
ISAF	26,373	23,881	29,363	27,019	25,356	25,380	28,858	31,227	27,209
Total furnace	140,205	127,355	145,064	138,716	150,566	138,531	140,518	143,616	136,185
Contact types	24,056	21,732	22,427	21,417	21,852	20,877	21,212	21,424	20,505
Totals	164,261	149,087	167,491	160,133	172,418	159,408	161,730	165,040	156,690
Shipments									
Furnace types									
Thermal	12,294	10,601	12,227	10,574	13,171	12,138	10,486	14,616	13,792
SRF	21,902	22,151	24,722	21,845	25,293	22,457	22,604	24,213	25,324
HMF	4,381	5,007	5,234	4,063	4,475	4,539	4,810	4,597	5,468
GPF	11,882	10,896	12,714	10,064	11,088	10,923	11,284	12,201	12,075
FEF	17,829	16,728	17,657	16,414	19,095	17,985	18,247	19,694	18,751
HAF	38,837	38,389	40,167	36,050	48,764	40,397	40,288	41,296	43,420
SAF	1,498	1,055	1,587	1,189	938	1,141	2,186	1,728	2,017
ISAF	25,796	22,670	27,310	20,871	26,024	24,213	28,655	27,320	27,027
Total furnace	134,419	127,497	141,668	121,070	148,848	133,793	138,560	145,665	147,874
Contact types	22,640	21,906	22,832	20,587	23,903	22,588	21,138	22,848	24,576
Totals	157,059	149,403	164,600	141,657	172,751	156,381	159,698	168,513	172,450
Producers' Stocks, End of Period									
Furnace types									
Thermal	22,875	23,904	24,429	23,886	23,600	23,449	24,580	22,752	18,542
SRF	44,448	42,302	41,703	44,272	46,086	47,128	48,787	47,528	43,751
HMF	8,753	7,937	7,819	9,264	7,985	6,974	7,306	8,203	7,765
GPF	8,747	9,928	9,996	10,988	11,483	10,200	9,108	9,586	8,582
FEF	18,319	20,736	19,156	18,715	16,959	19,730	21,887	22,728	21,228
HAF	63,268	57,877	58,436	66,340	68,755	68,991	65,734	61,229	59,165
SAF	3,267	5,269	3,891	3,460	4,443	6,410	7,235	6,681	7,803
ISAF	35,017	36,228	38,028	44,250	43,582	44,735	44,938	48,812	48,968
Total furnace	204,694	204,181	204,454	221,175	222,893	227,617	229,575	227,519	215,804
Contact types	73,542	73,368	72,963	73,793	70,890	69,179	69,286	67,862	63,791
Totals	278,236	277,549	276,417	294,968	293,783	296,796	298,861	295,381	279,595
Exports									
Furnace types									
Total furnace	29,965	27,614	41,213	37,056	29,143	35,186	24,810	24,810	.....
Contact types	10,598	11,989	11,738	10,619	11,967	14,516	12,116	12,116	.....
Totals	40,563	39,603	52,951	47,675	41,110	49,702	36,926	36,926	.....

Source: Bureau of Mines, United States Department of the Interior, Washington, D. C.

U. S. Automotive Inner Tubes

(Thousands of Units)

Year	Shipments: Original Equipment	Shipments: Replacement	Shipments: Export	Shipments: Total	Production	Inventory End of Period
1960	3,320	36,511	1,120	40,982	40,851	11,034
1961						
Jan.	237	4,783	56	5,076	3,208	9,394
Feb.	231	2,988	58	3,277	3,140	9,246
Mar.	281	3,246	60	3,588	3,359	9,014
Apr.	299	2,533	70	2,902	2,939	9,096
May	306	2,424	65	2,795	3,190	9,487
June	297	2,970	56	3,323	2,838	8,948
July	224	2,777	45	3,046	2,733	8,641
Aug.	225	2,909	57	3,192	3,211	8,700
Sept.	250	2,529	76	2,856	3,081	8,890

Source: The Rubber Manufacturers Association, Inc.

U. S. Rubber Industry Sales and Inventories

(Millions of Dollars)

	Values of Sales*				Manufacturers' Inventories*			
	1958	1959	1960	1961	1958	1959	1960	1961
Jan.	448	508	530	450	1,100	1,013	1,148	1,130
Feb.	413	490	540	460	1,087	1,032	1,140	1,130
Mar.	412	506	510	490	1,112	1,030	1,160	1,120
Apr.	429	543	530	480	1,047	1,015	1,190	1,130
May	428	524	550	500	1,020	995	1,180	1,140
June	445	520	520	560	986	1,013	1,200	1,130
July	478	519	480	480	980	1,075	1,230	1,120
Aug.	438	492	480	520	1,024	1,113	1,240	1,130
Sept.	464	544	510	530	1,024	1,114	1,210	1,120
Oct.	493	555	490	...	1,022	1,115	1,160	...
Nov.	472	482	550	...	1,018	1,120	1,140	...
Dec.	518	508	520	...	994	1,124	1,120	...
Total	5,438	6,191	6,210		12,414	12,759	14,118	...

* Adjusted for seasonal variation. Source: Office of Business Economics, United States Department of Commerce.

Time out for admiration with TITANOX®

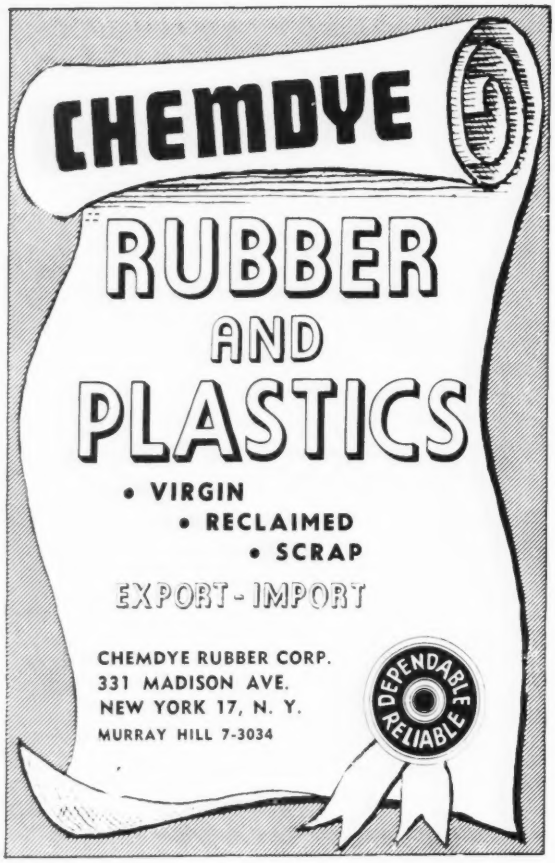
TITANOX titanium dioxide pigments add eye-catching beauty and sales appeal to a wide range of rubber and plastic products—including white and light-colored luggage that attracts admiring glances.

For many rubber and plastic products TITANOX-RA or TITANOX-RA-50 provide outstanding whiteness, brightness and opacity. Where weather resistance is of prime importance TITANOX-RA-NC may be preferred. Also new TITANOX-RA-40, rutile TiO_2, yields clean, bright whites and sharp tints at economically low loadings in many compositions. No matter which you choose, all TITANOX pigments have the ease of dispersion and uniformity that increase production efficiency.

For complete information on the type of pigment to meet your requirements, consult our Technical Service Department. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; offices and warehouses in principal cities. In Canada: Canadian Titanium Pigments, Ltd., Montreal. 7909

TITANIUM PIGMENT CORPORATION
SUBSIDIARY OF NATIONAL LEAD COMPANY

TITANOX



TO HAVE *YOUR COPY* OF
RUBBER WORLD
ON YOUR DESK WHEN NEEDED

Subscription Postpaid

United States	$5.00
Canada	6.00
All Other Countries	10.00

Single Copy, 50¢ in U. S.; $1.00 Elsewhere

The World's Rubber Progress
Every Month

RUBBER WORLD
FOUNDED 1889

630 THIRD AVENUE, NEW YORK 17, N. Y.

FILL IN AND MAIL WITH YOUR REMITTANCE

..... 1961

Enclosed find $ for which enter subscription to RUBBER WORLD, beginning with the number.

Name .....

Firm .....

Street .....

City .....

U. S. Automotive Pneumatic Casings

(Thousands of Units)

Year	Shipments: Original Equipment	Shipments: Replacement	Shipments: Export	Shipments: Total	Production	Inventory End of Period
Passenger Car						
1960	36,321	65,222	895	95,685	105,466	23,583
1961						
Jan.	2,191	5,955	44	8,189	8,234	23,691
Feb.	1,930	4,152	43	6,125	7,643	25,268
Mar.	2,134	5,876	72	8,082	8,195	25,385
Apr.	2,602	6,444	54	9,100	7,866	24,150
May	3,031	6,944	57	10,032	8,501	22,669
June	2,791	7,524	73	10,388	8,803	21,157
July	1,765	6,688	43	8,496	7,836	20,525
Aug.	1,657	7,266	80	9,002	9,203	20,681
Sept.	2,340	6,354	80	8,774	8,784	20,769
Truck and Bus						
1960	3,686	9,249	728	13,875	14,463	3,797
1961						
Jan.	258	635	48	941	988	3,991
Feb.	261	569	49	879	948	4,070
Mar.	313	719	52	1,084	1,016	4,000
Apr.	332	758	43	1,133	1,017	3,883
May	346	772	42	1,160	1,103	3,834
June	332	949	40	1,321	1,116	3,643
July	258	802	41	1,101	1,045	3,573
Aug.	271	950	46	1,267	1,142	3,445
Sept.	279	885	50	1,214	1,119	3,328
Total Automotive						
1960	40,203	77,773	1,751	119,698	111,569	27,540
1961						
Jan.	2,449	6,590	91	9,130	9,221	27,682
Feb.	2,191	4,722	92	7,004	8,591	29,338
Mar.	2,448	6,595	123	9,166	9,212	29,385
Apr.	2,934	7,202	96	10,232	8,882	28,033
May	3,377	7,716	99	11,192	9,604	26,503
June	3,123	8,473	113	11,709	9,919	24,800
July	2,023	7,490	84	9,598	8,881	24,098
Aug.	1,928	8,215	126	10,269	10,345	24,127
Sept.	2,620	7,239	130	9,988	9,903	24,096

Source: The Rubber Manufacturers Association, Inc.

U. S. Rubber Industry Economic Indicators

Year	Production Index*: Total Rubber and Plastics Products Seasonally Adjusted, % 1947-49 = 100	Production Index*: Total Rubber and Plastics Products Seasonally Adjusted, % 1957 = 100	Production Index*: Total Rubber and Plastics Products Without Seasonal Adjustment, % 1947-49 = 100	Production Index*: Total Rubber and Plastics Products Without Seasonal Adjustment, % 1957 = 100	% Return†: On Sales R&MP‡	% Return†: On Investment R&MP
1960						
Oct.	192	110	202	116		
Nov.	192	110	196	112		
Dec.	184	105	176	101	3.2	6.4
1961						
Jan.	180	103	189	108		
Feb.	178	102	188	108		
Mar.	168	96	176	108	2.9	5.2
Apr.	192	110	197	113		
May	199	114	194	111		
June	211	121	205	117	3.8	7.6
July	215	123	181	104		

* F.R.B. Index of Industrial Production revised to include plastics products and change base period.

† Base Data F.T.C.-S.E.C.-Quarterly Financial Reports—% Calculated by RMA.

‡ R&MP = Rubber and Miscellaneous Plastics, a classification revised according to the 1959 Standard Industrial Classifications.

PRODUCTS Can Grow Old Gracefully too

HARCHEM SEBACATE PLASTICIZERS WILL GIVE YOURS THIS UNIQUE QUALITY

Extend the life and the original looks of your products and you build customer good will that reflects itself in greater sales and profits. Nothing will give them more stability, more protection against the inroads of age than Harchem Sebacate Plasticizers. Whether you seek resistance to heat, cold, water, weather or physical abuse, the key to your problem can be found in the chart of four Sebacic Acid Esters found below.

Plasticizer	Specific Gravity 25°/25°C ±.003	Viscosity 25°C, cps	Compatible With	Outstanding Characteristics
Dibenzyl Sebacate	1.055	21-22	Polyvinyl Chloride and Copolymers, Polyvinyl Butyral, Synthetic Rubbers	Excellent Solvation, Very Low Volatility, Permanence, Good Electricals, Low Temp. Flexibility
Dibutyl Sebacate	0.935	7.9	Vinyl Resins, Cellulose Acetobutyrate, Synthetic Rubbers, Rubber Hydrochloride, Polymethyl Methacrylate	Low Temp. Flexibility, Excellent Aging Qualities, Non-Toxic
Dimethyl Sebacate	0.986*	3.54 @30°C	Vinyl Resins, Synthetic Rubbers, Cellulose Nitrate, Cellulose Acetobutyrate, Acrylic Resins	High Solvency and Efficiency, Wide Compatibility, Concentrated Source of Sebacyl Radical
Dioctyl Sebacate	0.913	17.4	Polyvinyl Chloride and Copolymers, Polyvinyl Butyral, Synthetic Rubbers, Cellulose Nitrate, Cellulose Acetobutyrate	Excellent Low Temp. Flexibility, Low Volatility, Excellent Soapy Water Resistance, Good Electricals

*30°/20°C

WRITE FOR BULLETIN OR CONSULT
CHEMICAL MATERIALS CATALOG PAGES 159-161

THE KEY TO HARCHEM® BETTER PLASTICS

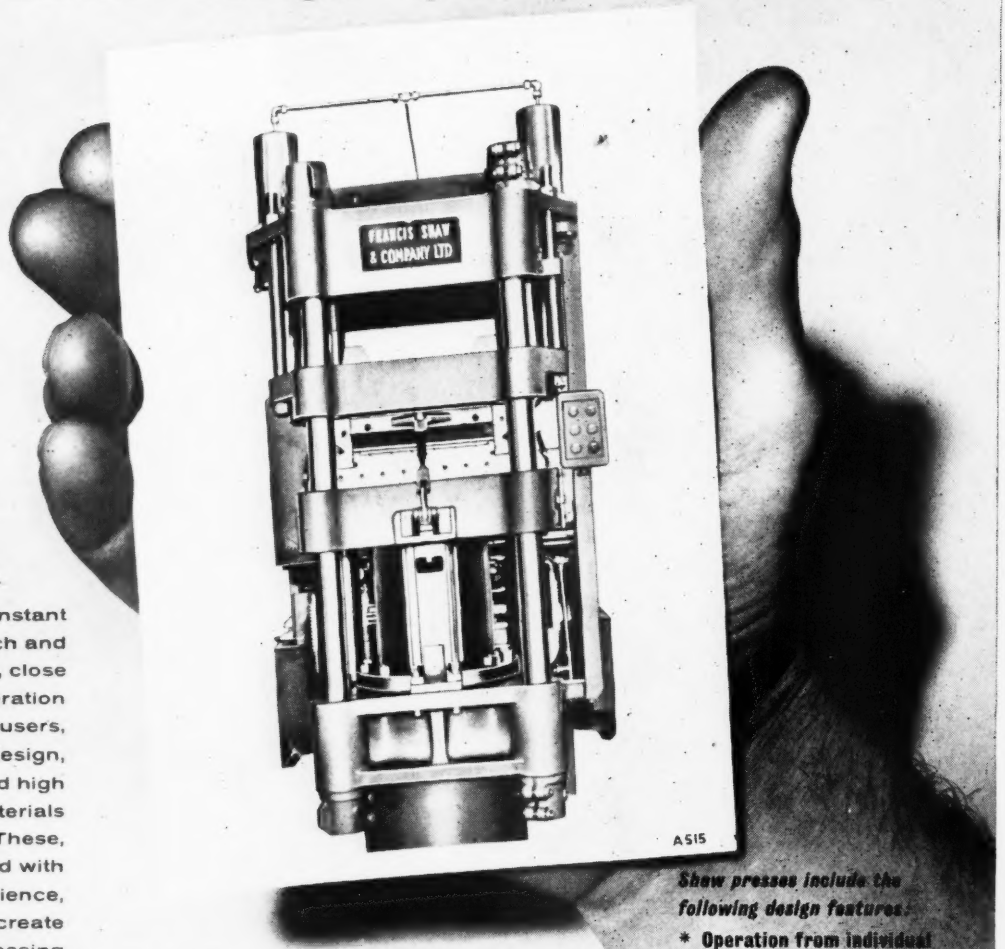
HARCHEM DIVISION

WALLACE & TIERNAN, INC.
25 MAIN STREET, BELLEVILLE 9, NEW JERSEY
IN CANADA: HARCHEM LIMITED, TORONTO

behind every

Francis Shaw machine

research · design · quality engineering



Constant research and development, close co-operation with users, advanced design, selected high quality materials . . . These, coupled with long experience, help to create processing machinery of unrivalled perfomance.

Francis Shaw hydraulic presses are tailor-made to every requirement of the rubber industry. Illustrated is a 254-ton press recently installed for production of car battery containers.

Shaw presses include the following design features:

* **Operation from individual pumps or hydraulic mains.**
* **Automatic cycle if required.**
* **Steam or electrical heating.**
* **Appropriate size for every requirement.**

S ***Francis Shaw***

FRANCIS SHAW & COMPANY LIMITED MANCHESTER 11 ENGLAND

TELEGRAMS: "CALENDER" MANCHESTER TELEPHONE: EAST 1313-8 TELEX 66-357

London Office: 22 Great Smith Street London SW1 Telephone: Abbey 3245 Telegrams: Vibrate London Telex: 22250
Canada: Francis Shaw Canada Ltd Grahams Lane Burlington Ontario Telephone: Nelson 4-2350
Telegrams: Calender Burlington Ontario Telex: Canada Calender Hamilton 021 662

OVERSEAS AGENTS THROUGHOUT THE WORLD

P4382

CLASSIFIED ADVERTISEMENTS

All Classified Advertising Must Be Paid in Advance
(No agency commission allowed except on display units)

GENERAL RATES	Light face type 20 cents per word. Bold face type 25 cents per word. Minimum $9.00.
SITUATIONS WANTED RATES	20 words or less $1.00. Extra words 10 cents each.
CONSULTANTS DIRECTORY	4 lines $10.00 per insertion.

Allow eight words for keyed address.

Letter replies forwarded without charge, but no packages or samples
ADDRESS ALL REPLIES TO NEW YORK OFFICE AT 630 THIRD AVENUE, NEW YORK 17, N. Y.

SITUATIONS OPEN

SENIOR RESEARCH CHEMISTS

Challenging openings on San Francisco peninsula.
Degree in Chemistry or Chemical Engineering.
Ten years experience in rubber compounding and production.
Record of development in precision molded rubber products.
Salary open-Liberal benefits.
Advantages of small division with security and financial stability of large corporation.
Replies confidential.

Send resume to
Box #2632, RUBBER WORLD

SITUATION OPEN

TECHNICAL SALES REPRESENTATIVE

■ Nationally known chemical company needs Chemist with rubber compounding experience for sales assignment in Chicago area. Training provided. No sales experience required. Straight salary plus bonus, traveling expenses and car. Call for appointment.

PENNSALT CHEMICALS CORP.
141 W. Jackson Blvd. Chicago, Ill.
WEbster 9-2540

TIRE COMPOUNDER

NATIONAL RUBBER MANUFACTURER HAS CURRENT POSITION OFFERING UNUSUAL GROWTH OPPORTUNITIES FOR EXPERIENCED TIRE COMPOUNDER. APPLICANTS MUST HAVE CHEMICAL ENGINEERING OR CHEMISTRY DEGREE. POSITION OFFERS OPPORTUNITY IN THE INDUSTRY'S FOREMOST TIRE DEVELOPMENT LABORATORIES UTILIZING LATEST TECHNIQUES. SEND RESUME IN STRICT CONFIDENCE TO BOX 2663.

"AN EQUAL OPPORTUNITY EMPLOYER"

CHEMISTS OR CHEMICAL ENGINEERS

Product and development rubber compounder, including three to five years practical experience in tire development, processing and manufacturing. Experience with various types of synthetic rubber is desirable.

Would introduce new rubber polymers, supply technical service and follow-up in all domestic and foreign customer's plants. A practical rather than a theoretical approach to product applications is essential and extensive domestic and foreign travel will be required.

Salary commensurate with experience and ability.
Please submit your complete resume in confidence to:

Employee Relations Department
GOODRICH-GULF CHEMICALS, INC.
1717 East Ninth Street
Cleveland 14, Ohio

PLANT CHEMIST:

EXPERIENCED IN LATEX DIPPING AND COMPOUNDING. MUST be capable of assuming immediate responsibility for production compounding, processing, and technical service. Medium-size growing organization, with excellent opportunity for advancement. Salary commensurate with experience. Send resumé in confidence. Address Box No. 2665, care of RUBBER WORLD.

WANTED—COST ESTIMATOR FOR MEDIUM-SIZE AAA1 molded and extruded rubber goods manufacturer located in small Michigan community. Write in confidence to Box No. 2660, care of RUBBER WORLD. All inquiries will be answered.

SENIOR DESIGN ENGINEER

Eastern tire plant has opening which requires person with an ME or EE degree and a minimum of 5 years' experience in plant engineering with emphasis on design, installation, and maintenance of tire machinery. Salary open. Liberal employe benefits. Write Box No. 2666, care of RUBBER WORLD.

CHEMIST WITH PLASTICS OR SPONGE RUBBER EXPERIENCE Progressive New England company manufacturing Sponge Rubber Products has opening for a man to take charge of development. The man we are seeking should have a good basic knowledge of sponge rubber or thermoplastic compounds or both. Much of our development is leaning toward thermoplastic materials. This is an excellent opportunity for the right man. Address Box No. 2667, care of RUBBER WORLD.

GUARANTEED REBUILT MACHINERY

IMMEDIATE DELIVERIES FROM STOCK

MILLS, CALENDERS, TUBERS
VULCANIZERS, ACCUMULATORS

UNITED

HYD. PRESSES, PUMPS, MIXERS
CUTTING MACHINES, PULVERIZERS

UNITED RUBBER MACHINERY EXCHANGE
183-189 ORATON ST. **CABLE "URME"** **NEWARK 4, N. J.**

YOUR DIMES WILL DO IT AGAIN!

VACCINE

POLIO

BIRTH DEFECTS

ARTHRITIS

SO...SAY YES TO THE NEW MARCH OF DIMES

THE NATIONAL FOUNDATION • FRANKLIN D. ROOSEVELT, FOUNDER

R
VORLD

SITUATIONS OPEN (CONT'D)

CHEMIST OR CHIEF COMPOUNDER

Outstanding growth opportunity for qualified man now in 2nd or 3rd rubber compounding spot to take over the top spot with this well-known firm after just two years. Experience in Soling and Top-Lifting Materials required. Blown experience not necessary. We will pay an excellent salary, plus all fringe benefits and retirement to get the right man. Excellent living conditions and schools within easy drive of major metropolitan area on the East Coast. Please write giving full background. Address Box No. 2659, care of RUBBER WORLD.

SITUATIONS WANTED

TECHNICAL MAN WITH 29 YEARS' EXPERIENCE IN RUBBER AND PLASTICS DESIRES POSITION AS TECHNICAL DIRECTOR OR CHIEF COMPOUNDER IN MOLDED AND EXTRUDED GOODS PLANT. EXPERIENCE IN COMPOUNDING, RESEARCH, DEVELOPMENT, TROUBLE SHOOTING, SPECIFICATION COMPOUNDING, QUALITY CONTROL, PROCESSING, MANUFACTURING SPECIFICATIONS, PROCEDURE WRITING, INSTRUMENT DEVELOPMENT. ADDRESS BOX NO. 2662, care of RUBBER WORLD.

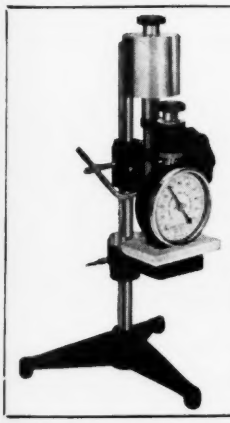
SALES OR MARKETING OPPORTUNITY

31, Chemistry Degree, six years' successful experience selling molded elastomers and resins to O.E.M.'s. Current position affords little future. Seeking challenging growth situation, prefer Northeast. Address Box No. 2664, care of RUBBER WORLD.

MACHINERY AND SUPPLIES FOR SALE

FOR SALE: 1—THROPP 18" x 50" 2-ROLL MILL 125 H.P.; 1—Thropp 6" x 12" 2-Roll Mill 7½ H.P.; 1—No. 18 Cumberland Rotary Cutters; 3—Baker-Perkins Sigma-blade jacketed Mixers, 150, 100, and 50 gal.; 3—Mikro Pulverizers, Bantam, 1SH and 1SI; 6—Stokes Preform Presses, models R, T, DD2, DDS2, DS2, and D4; partial listing, send for details. BRILL EQUIPMENT CO., 35-49 Jabez St., Newark 5, N. J. Tel.: MArket 3-7420.

FOR SALE: 1—#3-A BANBURY MIXER, 200-HP. motors; 1—50" Cameron duplex slitter model 24-3A; 2—24" x 24" Bolling hydraulic presses, 16" rams; 2—Lab rubber mills 6" x 12", 6" x 16"; 1 National Erie 3½" steamheated extruder. CHEMICAL & PROCESS MACHINERY CORP., 52 9th Street, Brooklyn 15, New York. HY 9-7200.



RUBBER HARDNESS

ORIGINAL SHORE

DUROMETER

ASTM D676 AND ASTM D1484

Various models for testing the entire range of hardness from elastomeric to rigid. Available in quadrant or round dial case. May be used free hand or on table top OPERATING STAND WITH DEAD WEIGHT (left).

THE SHORE INSTRUMENT & MFG. CO., INC.

90-35 VAN WYCK EXP., JAMAICA 35, N.Y.

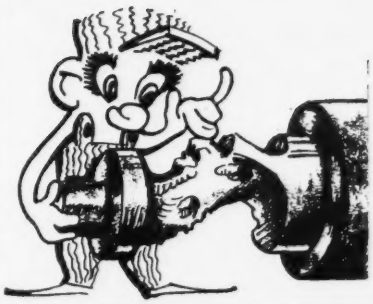
CUSTOM COMPOUNDING

We have facilities to handle all your rubber compounding requirements. If needed certifications can be issued to guarantee these compounds to any and all specifications. Check us for the best in service, quality and price.

HANOVER INDUSTRIES, INC.

Box 78 **Beverly 5-2588**

MERIDEN, CONNECTICUT



ALBERT, MACHINERY and REPLACEMENT PARTS are synonymous to the rubber industry

P. E. ALBERT & SON

21 Nottingham Way Trenton 3, New Jersey Phone: EXport 4-7181

FOR SALE | FARREL 84" MILL

Also NO. 9 BANBURY

Mill immediately available • top condition • loaded

1—24" x 84" floor level arrangement with 150 hp., .8 PF synchronous motor, 440-V., 3 ph., 60-cy. with dynamic braking.

1—21" x 24" x 36" Vaughn refiner with 150 hp. synchronous motor.

10—Twin McNeil tire presses models No. 40 and No. 45.

1—No. 9 Banbury with 2-speed, 300/150 hp. motor, 440-V. control.

STEWART BOLLING & COMPANY, Inc.

3190 East 65th St.

Cleveland 27, Ohio **Phone MIchigan 1-2850**

MACHINERY AND SUPPLIES FOR SALE (CONT'D)

2—THROPP 16" x 48" MILLS. FARREL 16" x 40" MILL. OTHER sizes up to 60". Hydraulic Presses: 500-ton Utility Press, four 30 x 48 openings. 300-ton upstroke 40" x 30". 300-ton upstroke 22" x 35". 240-ton upstroke with ten 24" x 56" platens. 200-ton Williams and White 24" x 42" platens. 2—Birdsboro 200-ton, 32" x 24", 4 openings. 200-ton Farrel 30" x 30". Farrel 150-ton 36" x 36". Also other sizes. Royle #2 Tuber. NAT. 3½" crosshead Extruder. Adamson 6" Rubber Extruder. 60" Spreader heads. 50" Smoothing Calender. New and used laboratory 6" x 13", 6" x 16", and 8" x 16" Mills and Calenders. Baker-Perkins and Day heavy-duty jacketed Mixers up to 200 gallons. Hydraulic pumps and accumulators. Peerless 2-HP. Rubber Bale Cutter. 48" x 14" Dinker. Rotary Cutters. Taylor-Stiles 3-HP. Rubber Pelletizer. Banbury mixers, crushers, churns, tubers, vulcanizers, gas boilers, etc. SEND FOR SPECIAL BULLETIN. WE BUY YOUR SURPLUS MACHINERY. STEIN EQUIPMENT COMPANY, 107-8TH STREET, BROOKLYN 15, NEW YORK. STERLING 8-1944.

2200-TON BIRDSBORO HEAVY-DUTY RUBBER MAT PRESSES. Bed size 7' x 5'. Each press contains two 25"-diameter rams. Complete with Intensifiers for 4000 PSI. 6" Extruder Line Consisting Of: Royle #4 Extruder, Wire Take-ups, wire capstans, water troughs, and other accessory equipment. Farrel Birmingham Roll Grinder, 36" x 240", 20-HP. motor. Two 20"-diameter grinding wheels with 7½-HP. motor. Can be inspected under power. BELT PRESS—1500 Ton R. D. Wood, three 18"-diameter upmoving rams x 36" stroke. Bed size 50" x 240". 1" NRM Steamheated Laboratory Extruder. Like New! With variable-speed pulley drive. 3½" National Erie Extruder, steam-heated. 3¼" Royle #2 Rubber Extruder. Span Grinder, complete with 25-HP. motor. Rubber Bale Cutter, Peerless Knife Type, also Hydraulic Guillotine Type. 24" x 24" Bale. Aetna 5' x 10' Steam Vulcanizer. With quick-opening-type door. Clean job. We carry a complete line of mixers, vulcanizers, calenders, churns, bale cutters and other allied equipment for the rubber industry. WE WILL FINANCE. What do you need? What do you have for sale? JOHNSON MACHINERY COMPANY, 90 Elizabeth Ave., Elizabeth, New Jersey. WE SPECIALIZE IN PLANT LIQUIDATIONS AND PURCHASES.

FOR SALE

NASH HYTOR COMPRESSORS

4—Size #2, 860 RPM, 10# pressure 240 C.F.M. 180 C.F.M. when used as Vacuum Pumps. Also 1—Size #3.

SEYBOLD PRECISION TRIMMER

1—64", Serial #6959, complete w/power driven back gauge and 7½ HP belt driven motor, 3 ph. 60 cy. 440 v.

Also, a large quantity New S.S. Valves, all sizes, 60% off List Price.

DALTON SUPPLY CO., 2181 E. Huntingdon St., Philadelphia 25, Pa.

MACHINERY AND SUPPLIES FOR SALE (CONT'D)

ANNOUNCING
INDUSTRIAL LIQUIDATION DIVISION
that's the name of this new division of our
86-YEAR-OLD COMPANY

The Joseph Rosenthal's Sons, Inc., of 1841 North Second Street, Philadelphia 22, Penna., have over the past several years been actively engaged in plant dismantling and demolition work. We have safely and satisfactorily completed many contracts for some of the leading firms in the country. We have acquired through our plant dismantlement work and also by outright purchase —hundreds of pieces of good used equipment that we have sold to the Rubber, Chemical, Paint, Plastics, etc. Companies. We say—"Business is good and will get better"—therefore, in order to better serve our growing clientele we have formed our INDUSTRIAL LIQUIDATION DIVISION. If you have idle equipment that you wish to dispose of—drop us a note with full description and we will quote you fair prices. We own and operate heavy equipment such as cranes, dozers, trucks, loaders, etc., and your invitation to us to dismantle, demolish, move your equipment to other locations, or scrap out entire plant or any part thereof, will have the prompt attention of our qualified personnel, who will inspect and submit the best proposal to save you dollars. Snip out our announcement—NOW—add our name to your list of suppliers. We can be of reliable service to you and await your reply.

MIXERS/SHREDDERS

Baker Perkins—5 UNITS available. Size VL/BB—Jacketed—320-Gal. total Capacity—200-Gal. working Capacity. Double Sigma-Type Blades with removable serrated shoes. Double Screw Tilt with motor drive. NOTE:—We believe these "screw tilt type mixers"—to be the best on the market. Cost you more than 'counter weight type'—but believe well worth it. Only five (5) units left from original and identical fourteen (14) purchased. ACT FAST—CALL NOW—REgent 9-2816—ROSENTHAL, 1841 North Second Street, Philadelphia 22, Pa.

DISINTEGRATORS

9 UNITS Available—RIETZ Model RDH-18 with 50-HP. Motors and Controls. Also 9 Viking Pumps, Model DQ with 7½ HP.—155 RPM Gearhead Motors. NOTE: We purchased this equipment from our customer at Clinton, Iowa. Then—they called us to ask our permission to delay delivery for about 90 days.—"O.K. we said"—To you we say,—"We will accept your orders now for delayed delivery at a much lower price than we would have to charge after removal and placing in storage." We sold every previous Disintegrator we had in stock—so to our former disappointed customers and new ones too, we further say—DON'T DELAY—CALL ROSENTHAL NOW —REgent 9-2816—or mail your order (subject to prior sale of course) to 1841 North Second Street, Phila. 22, Penna.

FILTER PRESSES:

The well-known SHRIVER make, all in excellent condition and only 38 Units left.—28-30" size—2-24"—and 8-12"—all with desired amount of plates and frames.
Closed Delivery—Single feed and discharge. Pyramid design plates: Call or write your reliable source of supply—ROSENTHAL, 1841 North Second Street, Philadelphia 22, Pa. REgent 9-2816.

— FOR SALE —

4—Blaw Knox 6' x 40' horizontal vulcanizers with quick-opening doors, 250# working pressure, ASME.
2—Royle #½ extruders, complete.
1—Peerless, guillotine cutter, 30" blade, with motor.
1—Allen 4" extruder with 25-HP. motor.
Address Box No. 2661, care of RUBBER WORLD.

FOR SALE: LABORATORY MILLS—NEW AND USED, 6 x 12", 6 x 13", 6 x 16", 8 x 18", 10 x 24", complete with oil seals, drive, brake motor, and starter. RUBBER & PLASTIC MACHINERY OF NEW JERSEY, P.O. Box 1543, Trenton, New Jersey.

2—BUTTERFLY MIXERS, BB, 6,000-lb. capacity each. 3—Falk Gear Reducers, 350 HP., 352 RPM. Large stock of blowers and ventilating fans. CARL NUSSBAUM, JR., 1719 W. Main Street, Louisville 3, Kentucky.

FOR SALE: #11 BANBURY MIXERS REBUILT IN '61, USED 200 hours since, sliding air-oper. door, standard blade, spray-cooled side, new approximately 1940-41, Westinghouse 250/500-HP. motor. BARGAIN 8" ALLEN STRAINER, 17" diameter, head, water cooled, 10 HP. REASONABLE, 700 CFM PENNSYLVANIA AIR COMPRESSOR, heavy duty, duplex new '40, 100# psi. 400/600-CFM NORWALK AIR COMPRESSOR, single stage, water cooled, new '40. EVEREADY: 803 Housatonic Avenue, Bridgeport, Conn. EDison 4-9471-2. E. J. McCallum, Jr.

FOR SALE: BAKER-PERKINS #16-UUEM, 150-GALLON DISPERsion jacketed mixer, 150-HP. XP motor, Vaulted Cover; Baker-Perkins 100-gallon T347 Stainless jacketed dispersion blade mixer. Baker-Perkins #15-UUMM dispersion blade double-arm mixer, 100 gallon, jacketed, 100 HP. explosionproof motor, motorized tilt, cored blades, compression ram cover. Also 200-gallon B-P mixers. PERRY EQUIPMENT CORPORATION, 1424 North 6th Street, Philadelphia 22, Pa.

The Classified Columns of
RUBBER WORLD
bring prompt results at low cost.

Reprints Available

Reprints of the article, "Available Synthetic Rubber Latices," which appeared in the March issue of RUBBER WORLD may be obtained at a cost of 20¢ a copy.

This is a complete list of synthetic rubber latices offered in the United States and Canada including acrylic, SBR, CR, fluorocarbon, IIR, and NBR types for use in the rubber, textile, paint, paper, and adhesive industries.

Write: RUBBER WORLD, 630 Third Ave., New York 17, N. Y.

MACHINERY AND SUPPLIES WANTED

WANTED: SPREADER OR COATING MACHINE (KNIFE OVER Rubber Roll) 60" or Wider. P.O. Box 46, Arverne 92, New York. Tel: NE 4-2531.

COLORS FOR RUBBER-VINYLS

FINELY PULVERIZED, BRILLIANT

Midwest: FRED L. BROOKE CO.,
P. O. Box 463, Oak Park, Ill.
Pacific Coast: ERWIN GERHARD
465 California St.
San Francisco 4, Calif.

PALMER SUPPLIES CO.
2281 Scranton Rd., Cleveland
800 Broadway, Cincinnati
211 E. Robinson Ave., Orlando, Fla.

BROOKLYN COLOR WORKS, INC.
MORGAN AND NORMAN AVENUES, BROOKLYN 22, N. Y.

CUTTING—RUBBER—SOLES
WELLMAN MACHINES
LIGHT DUTY—HEAVY DUTY—AUTOMATIC
CUT BEVEL—30° to 90°
WELLMAN CO., MEDFORD, MASS., U. S. A.

CONSULTANTS & ENGINEERS

HALE & KULLGREN, INC.
Specialists in Processes and Plants for Rubber and Plastics
A Complete Engineering Service
including: Economic Surveys; Process Design;
Installation; Contracting and Operation.
613 E. Tallmadge Ave., Akron 10, Ohio Franklin 6-7161

SEND FOR FREE DATA ON RESEARCH
☐ Services for YOU
☐ Polymer Consultant
☐ Coatings Consultant

Foster D. Snell, inc.
CONSULTING CHEMISTS • CHEMICAL ENGINEERS
29 West 15th Street
New York 11, New York
WAtkins 4-8800
Direct Dialing Area 212
Baltimore, Md.
Bainbridge, N. Y.
MEMBER AMERICAN COUNCIL OF INDEPENDENT LABORATORIES

index to advertisers

A

Accurate Products, Inc. 46
Adamson United Co. 39
Albert, P. E., & Son 139
American Synthetic Rubber Corp. .. 45
American Zinc Sales Co. 115
Amoco Chemicals Corp. 17

B

Barco Manufacturing Co. 58
Beacon Chemical Industries, Inc. ... 44
Bolling, Stewart, & Co., Inc. 139
Brooklyn Color Works, Inc. 140

C

Cabot Corp. ..... Insert 97-100
Carter Bell Mfg. Co., The 10
Chemdye Rubber Corp. 134
Claremont Flock Corp. 58
CLASSIFIED
ADVERTISEMENTS ... 137, 139, 140
Cleveland Liner & Mfg. Co., The .. 27
Columbian Carbon Co. 40, 41
CONSULTANTS & ENGINEERS ... 140
Continental Carbon Co. 32, 33
Copolymer Rubber & Chemical
Corp. ..... Insert 21

D

Dalton Supply Co. 139
Dow Corning Corp. 121, 127
DPR Incorporated. A Subsidiary of
H. V. Hardman Co. 56
du Pont de Nemours, E. I., & Co.
Third Cover

E

Eagle-Picher Co., The 56
Eastman Chemical Products, Inc. ... 54
Enjay Chemical Co., A Division of
Humble Oil & Refining Co. 117
Erie Engine & Mfg. Co. 14

F

Farrel-Birmingham Co., Inc. 13C

G

General Aniline & Film Corp. 55
General Electric Co., Silicone
Products Dept. 60
General Tire & Rubber Co., The
(Chemical Division) 28, 29
Glidden Co., The 123
Goodrich, B. F., Chemical Co. 3
Goodrich-Gulf Chemicals, Inc.
Insert 35-38
Goodyear Tire & Rubber Co., Inc.
The (Chemical Division)..Insert 11-12
13A-13B

H

Hale & Kullgren, Inc. 140
Hall, C. P., Co., The 65
Hanover Industries 139
Harchem Division, Wallace &
Tiernan, Inc. 135
Huber, J. M., Corp. 70

I

Iddon Brothers, Ltd. 52
Industrial Ovens, Inc. 31
Institution of the Rubber Industry .. 42

K

Ketjen Carbon, Ltd. 6

L

Linde Co., Division of Union Carbide
Corp. 122

M

Muehlstein, H., & Co., Inc. .. Back Cover

N

Natural Rubber Bureau 69
Naugatuck Chemical, Div. of
U. S. Rubber Co.:
Rubber Chemicals Division 51

Neville Chemical Co. 57
New Jersey Zinc Co., The 61
Nopco Chemical Co. 22

O

Ohio Blow Pipe Co. 124
Ozone Research & Equipment Corp. 16

P

Pennsalt Chemicals Corp. 53
Phillips Chemical Co. .... Insert 62, 63
Pike, S. J., Co. 119

R

Reichhold Chemicals, Inc. 34
Richardson, Sid, Carbon Co. 142
Roebling's John A., Sons Division,
The Colorado Fuel & Iron Corp.
Insert 59
Royle, John, & Sons 9

S

Sargent's, C. G., Sons Corp. 120
Scott Testers, Inc. 68
Shaw, Francis, & Co., Ltd. 136
Shell Chemical Co., Synthetic
Rubber Division ..... Insert 47-50
Shore Instrument & Manufacturing
Co., Inc., The 139
Snell, Foster D., Inc. 140
Southern Clays, Inc. 116
Stamford Rubber Supply Co., The .. 8

T

Taylor Instrument Co. 64
Texas-U. S. Chemical Co. Insert 109-112
Textile Proofers, Inc. 18
Therm Ice Corp., A Subsidiary of
Publicker Industries, Inc. .. Insert 129
Titanium Pigment Corp. 133
Turner Halsey Co. 125

U

United Carbon Co., Inc. ... Insert 24-26
United Rubber Machinery Exchange 137
United Shoe Machinery Corp. 126
Universal Oil Products Co. 15

V

Vanderbilt, R. T., Co., Inc. 72
Velsicol Chemical Corp. 43

W

Welding Engineers, Inc. ..... 2nd Cover
Wellington Sears Co. 23
Wellman Co. 140
Westinghouse Electric Corp. 19
Wheelabrator Corp. 66, 67
White, J. J., Products Co. 20
Witco Chemical Co., Inc. 32, 33

BUSINESS STAFF

ROBERT L. MILLER
Advertising Sales Manager

JOHN P. GIUNTA
Eastern Sales Manager
630 Third Avenue
New York 17, New York
YUkon 6-4800

WILLIAM T. BISSON
Midwest Sales Manager
Office #436
The Sheraton Hotel
Akron 8, Ohio
JEfferson 5-1871

DON WALKER
Representative
333 North Michigan Avenue
Chicago 1, Illinois
STate 2-1266

RICHARD S. RAILTON
Representative
681 Market Street
San Francisco 5, California
SUtter 1-1060

H. JAMES THACKER
Representative
The Thacker Company
1330 Wilshire Boulevard
Los Angeles 17, California
HUbbard 3-5308

This index is maintained for the convenience of our readers. RUBBER WORLD assumes no responsibility to advertisers for its correctness.

...thanks...again and again

. . . to our many, many friends who made 1961 our biggest and finest year.

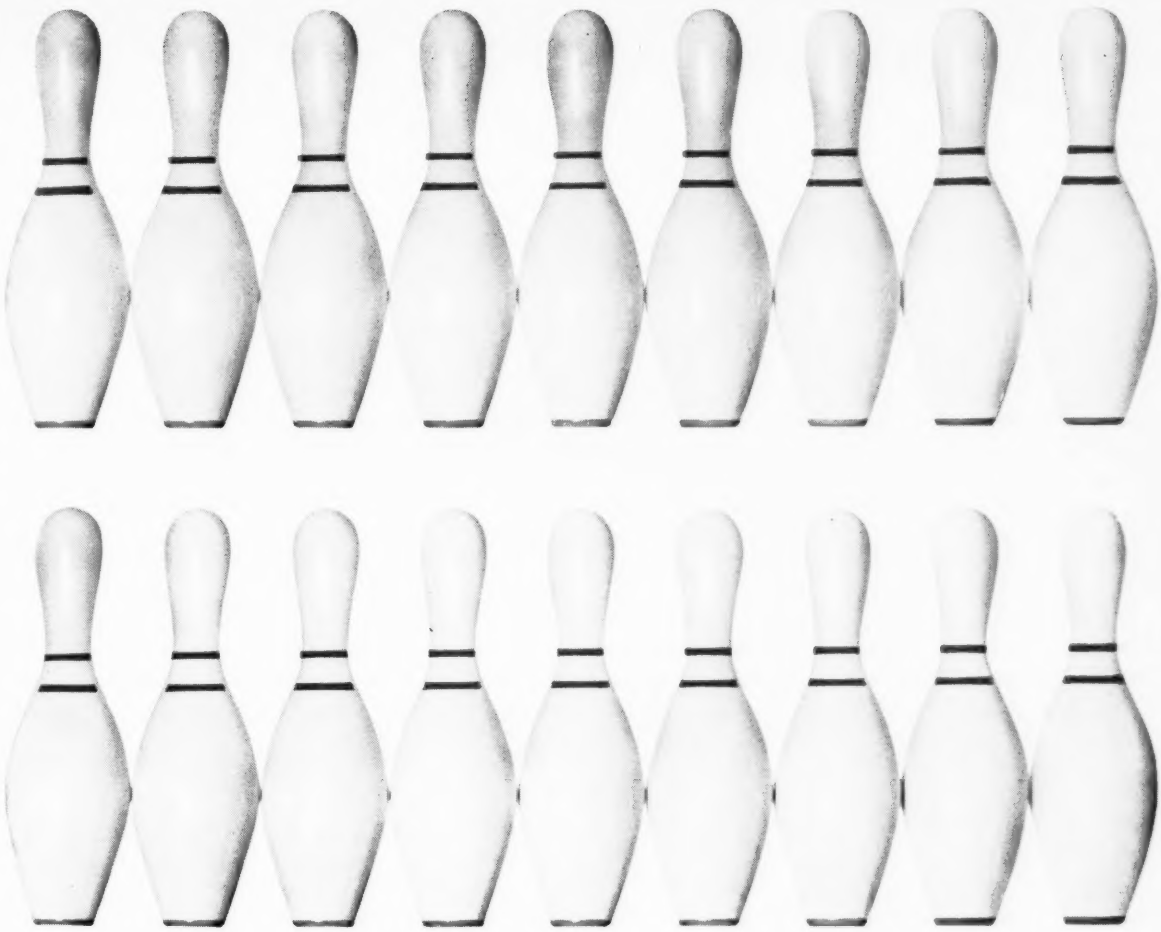
To all of you we send sincere thanks . . . a Happy Holiday Season and Best Wishes for the New Year.

TEXAS
CARBON BLACKS
®

Sid Richardson
CARBON CO.

FORT WORTH, TEXAS

GENERAL SALES OFFICES
EVANS BUILDING
AKRON 8, OHIO



Du Pont means *UNIFORMITY* in Rubber Chemicals

Du Pont rubber chemicals are made to exacting standards of quality and reliability to meet rigid inspection controls.

That's why you, like so many leading manufacturers, can depend on Du Pont rubber chemicals to meet your most rigorous requirements.

This is part of Du Pont's continuing effort to provide you with dependable rubber chemicals of the highest quality and uniformity.

Accelerators	Stabilizers	Special-purpose Chemicals
Antioxidants	Peptizing Agents	Rubber Dispersed Colors
Mold Lubricants	Blowing Agents	Reclaiming Chemicals

DU PONT
REG. U. S. PAT. OFF.

ELASTOMER CHEMICALS DEPARTMENT
RUBBER CHEMICALS

Better Things for Better Living . . . *through Chemistry*

MUEHLSTEIN

SERVICE

50 years of Progress & Service 1911-1961

Raw Materials for the Plastics Industry

POLYETHYLENES

POLYSTYRENES

VINYLS

NYLON

ACRYLICS

H. MUEHLSTEIN & CO. INC. 521 FIFTH AVENUE, N. Y. 17, N. Y.

REGIONAL OFFICES: Akron • Boston • Chicago • Los Angeles • Toronto • London • Hamburg

PLANTS & WAREHOUSES: Akron • Boston • Chicago • Detroit • Indianapolis • Jersey City • Los Angeles

11 OTHER U. S. DISTRIBUTION CENTERS • AGENTS IN 35 COUNTRIES